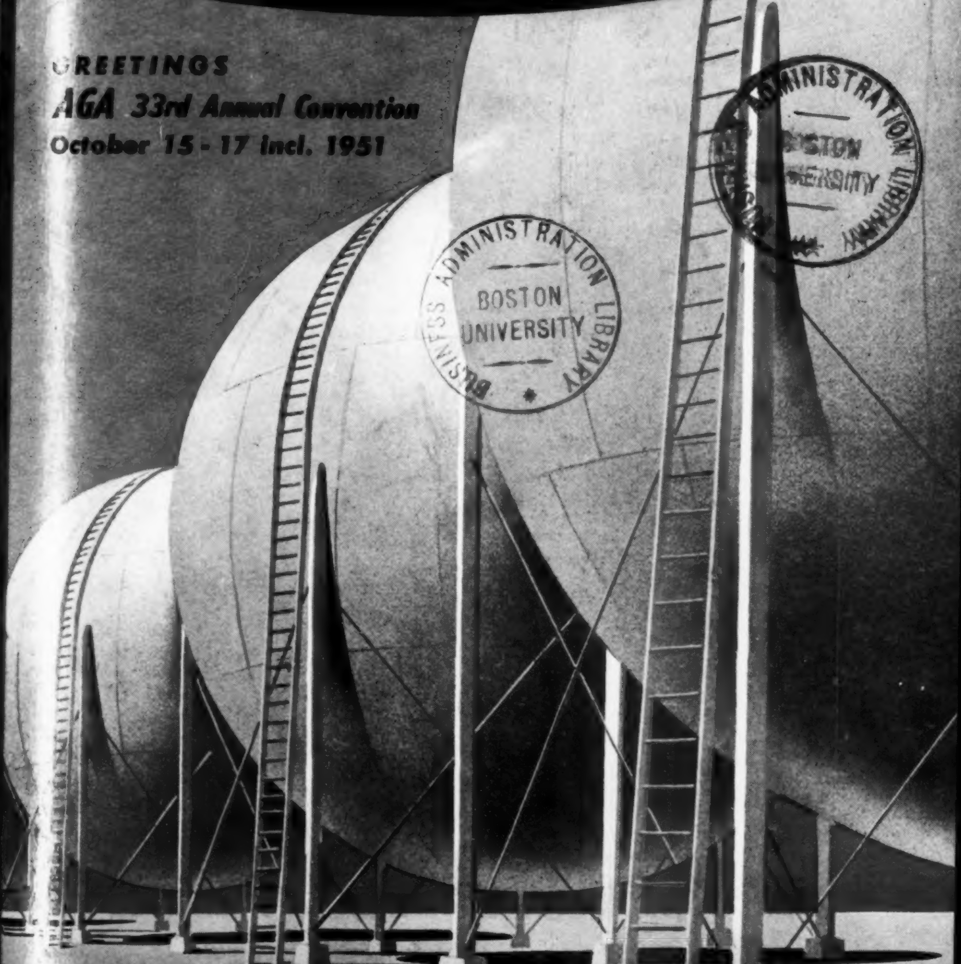
PUBLIC UTILITIES
FORTNIGHTLY

GREETINGS
AGA 33rd Annual Convention
October 15 - 17 incl. 1951



OCTOBER 25, 1951

THE GAS INDUSTRY— ***Timely articles by selected authors covering the impact of regulation, defense controls, and other matters vitally affecting its management.***

Public Utilities
FORTNIGHTLY

Volume XLVIII — OCTOBER 25, 1951 — Number 9

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Public Utilities Fortnightly . . stands for Federal and state regulation of both privately owned and operated utilities and publicly owned and operated utilities, on a fair and nondiscriminatory basis; for nondiscriminatory administration of laws; for equitable and nondiscriminatory taxation; and, in general—for the perpetuation of the free enterprise system. It is an open forum for the free expression of opinion concerning public utility regulation and allied topics. It is supported by subscription and advertising revenue; it is not the mouthpiece of any group or faction; it is not under the editorial supervision of, nor does it bear the endorsement of, any organization or association. The editors do not assume responsibility for the opinions expressed by its contributors.

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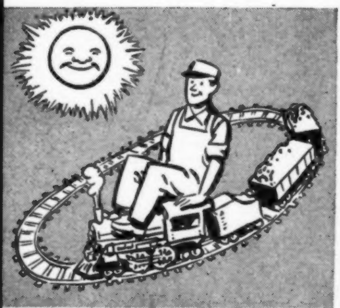
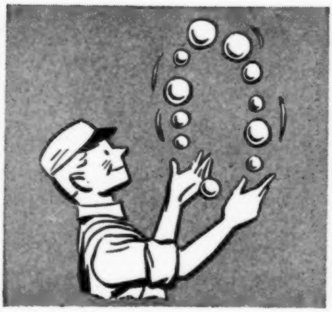
Five B&W Type E Pulverizers, serving a B&W Radiant Boiler of 800,000 lb. per hr. steam capacity.





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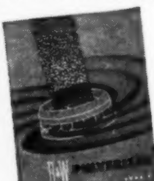

New Bulletin G-57 illustrates and describes the design, construction, operating and maintenance features of the Type E Pulverizer. Write: The Babcock & Wilcox Company, 85 Liberty Street, New York 6, New York.

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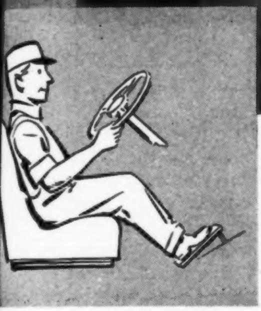

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e the accelerator on your au- nobile . . . assures proper coal- air mixture . . . produces de- d rate of steam generation r a wide range with coal con- ions suitable for sustained h combustion efficiency.

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Ball-and-ring grinding, anti-friction bearings, pressure lubrication, and automatic rejection of ungrindable materials make possible high output with minimum power demand.

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lping Industry Cut Steam Costs Since 1867

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Pages with the Editors

IT is not going to be hard for the members and delegates, who attend the thirty-third annual convention of the American Gas Association in St. Louis, October 15th to 17th, to point to their biggest single problem during the coming year. Perhaps we are guilty of some oversimplification, but we try to sum it up in one picture carried as the frontispiece in this issue—steel pipe or the lack thereof. Of course a lot of other problems follow in the wake of the pipe shortage.

IN this issue, which is designed to be of special interest to our friends and readers in the gas industry, we have the good fortune to bring a special message prepared for us by the chief executive of the American Gas Association, its president for the year 1950-51, D. A. HULCY, the genial president of the Lone Star Gas Company. MR. HULCY joined the Lone Star Gas Company in 1920 as an accounting clerk with a monthly salary of $155. He became president of the company in 1940 and was elected head of the American Gas Association at Atlantic City, New Jersey, ten years later. He is also a director and vice president of the Chamber of Commerce of the United States.

C. P. RATHER

STUART M. CROCKER

THE second article in this issue (beginning on page 534) is the product of another gas industry executive now heading up the Federal government's material control program as it affects the gas industry. He is C. P. RATHER, assistant deputy administrator for the Petroleum Administration for Defense —a post to which he was appointed on March 12, 1951. Born in Little Rock, Arkansas, educated at the University of Alabama and Georgia Institute of Technology (BS, civil engineering), MR. RATHER started his engineering career with affiliates of the Southern Natural Gas Company. He was elected vice president of the latter company in 1936 and in 1938 was named president.

* * * *

REPRESENTATIVE FRANK T. BOW of Canton, Ohio, whose article on the "Bow amendment" begins on page 539, was educated at Ohio Northern University and has practiced law in Canton with the exception of a 4-year hitch as assistant state attorney general of Ohio (1929-33) and a tour of duty in the Philippines during World War II as combat war correspondent with Ohio's 37th Division. He

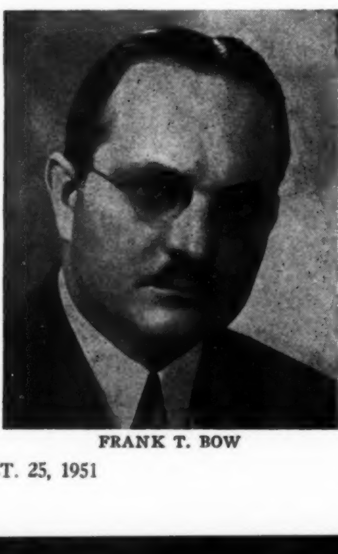
went to Washington, D. C., as legislative counsel during the 80th and 81st Congresses, and was elected to the 82nd Congress from Ohio's sixteenth district.

* * * *

STUART M. CROCKER, whose article on the effect of changing dollar values on gas earnings begins on pages 546, is another gas executive who is widely known and active in the high councils of his industry. Born in Cambridge, Massachusetts, and a graduate of Harvard (BS, '21), CROCKER began his career with the Radio Corporation of America. He later joined the General Electric Company, rising to the post of vice president in 1940. He became president and director of the Columbia Gas & Electric Corporation in 1943 and continued as president of the Columbia Gas System. He is now chairman of the board. MR. CROCKER has been exceptionally active in many industrial and philanthropic, as well as civic and political, groups.

* * * *

WALTER J. HERRMAN, vice president of Southern California Gas Company, whose article "Rate and Financing Problems of Gas Industry" begins on page 553, is a graduate (electrical engineering) of the University of California. He has also taught engineering and economics at Louisiana State University. He first entered the utility business with the Great Western Power Company of



FRANK T. BOW

GERARD M. IVES

California during the late twenties. After some investment work he came to Washington in 1937 to help a fellow Californian, Carl I. Wheat, with the telephone investigation of the Federal Communications Commission. MR. HERRMAN later joined the Theodore Gary Investment interests in Chicago and the former Commonwealth & Southern group, from which he joined his present organization.

* * * *

GERARD M. IVES, whose article on "Natural Gas As a Chemical Raw Material" begins on page 561, is vice president in charge of the public utilities division of the Guaranty Trust Company of New York. He has been associated with this bank since 1941, except for three years of wartime service with Army Ordnance. For eleven years before joining the Guaranty Trust Company, he was with Tri-Continental Corporation group of companies, serving in various capacities, including a vice presidency of Union Securities Corporation and vice president of the Blue Ridge Corporation.

THE next number of this magazine will be out November 8th.

The Editors

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Coming IN THE NEXT ISSUE

★

REGIONAL STOCKHOLDER MEETINGS

Consumers Power Company of Michigan is one of those progressive corporations which have tried out the experiment of holding regional meetings for stockholders. Justin R. Whiting, president of this utility company, gives us an account of the results to date and the reasons why such a policy was adopted. Local ownership, and interest in the welfare of a public utility, is a foundation for public relations which can be developed by bringing the company's message to the stockholder in his own home town.

BETTER PUBLICITY FOR UTILITY REGULATION

Does commission regulation for public utilities need "good press" or professional publicity techniques? It certainly does, according to Frank C. Sullivan, veteran newspaper man and now on the staff of the California Public Utilities Commission. He tells us how this has been organized in California and the results accomplished.

THE INVESTOR EYES THE RATE OF RETURN

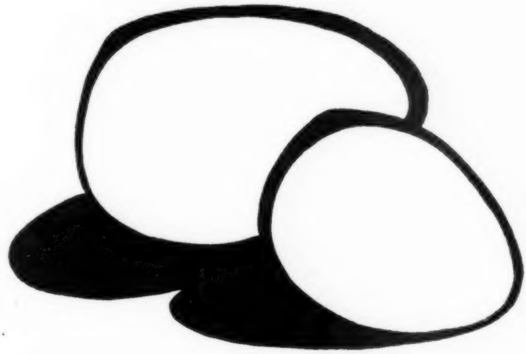
The question of the allowable rate of return for public utilities is one of great interest during an inflationary period. Regulatory commissions are aware, or should be aware, that additional capital must be obtained in a competitive market from those who are willing to invest in the particular company, regardless of the commission's judgment as to the sufficiency of the rate of return. John F. Childs, well-known utility security analyst, New York, has taken up this problem from the investor's point of view.

INTERESTING EMPLOYEES IN THE PROBLEMS OF MANAGEMENT

Alfred M. Cooper, who has spent years in personnel work on both public and private utility operations and has written volumes on the subject, explains the so-called "McCormick Plan." The key to interesting employees in problems of management, is the foreman or supervisory employee. And the key to his intelligent and sympathetic interest may well lie in an advisory form of participation.

★

Also . . . ***Special financial news, digests, and interpretations of court and commission decisions, general news happenings, reviews, Washington gossip, and other features of interest to public utility regulators, companies, executives, financial experts, employees, investors, and others.***



How much does an egg weigh?

A TURKEY egg weighs more than a hummingbird's. An ostrich egg weighs more than a chicken's.

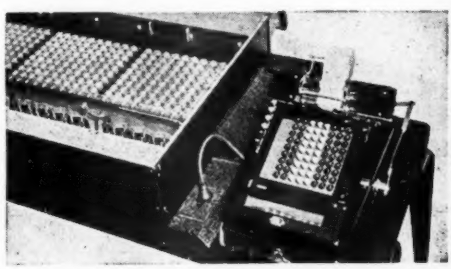
Eggs are not identical. They vary in size or weight. The same is true of your customers' bills.

Accurate information

In planning effective rate and promotional programs, therefore, many utilities find it important to know just how their customers' bills fall in various kilowatt-hour rate blocks.

Such bill analyses are compiled for them by the Recording and Statistical Corporation on specially designed electro-mechanical equipment. As many as 200,000 bills can be analyzed each day by our trained personnel. And the cost to you would be but a small fraction of a cent per item.

Would you like the complete facts about this accurate and economical method of compiling usage data? Write for "The One Step Method of Bill Analysis." It may save you time and money in the months ahead.



This Bill Frequency Analyzer—developed especially for utility usage data—automatically classifies and adds in 300 registers—in one step!

RECORDING AND STATISTICAL CORPORATION

100 Sixth Avenue **New York 13, N. Y.**

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Remarkable Remarks

"There never was in the world two opinions alike."
—MONTAIGNE

W. STUART SYMINGTON
Chairman, National Security Resources Board.

"The threat of inflation is as great a peril to our democratic institutions as the curse of Communism. We must meet and defeat both of these challenges to our own security."

Excerpt from "Survey" published by Guaranty Trust Company.

"It has become an American habit to be attracted by the prospective advantages of proposed expenditures without sufficiently weighing the disadvantages, which are as real and may be far greater."

D. A. HULCY
President, American Gas Association.

"We cannot tolerate unnecessary spending of any kind by the government. The social experiments and welfare schemes of the do-gooders and the so-called 'liberal' politicians must be adjourned [especially] increases of social security payments, socialized medicine, and health plans."

M. S. RUKEYSER
Columnist.

". . . American industry is currently operating in a no-man's land somewhere between free enterprise and a planned economy. On top of the restraints on independence of management judgment imposed by the controlled materials plan, price ceilings, wage and salary stabilization, the tax burden has put government in business as a major participant in profits to an increasing degree."

PAUL KAYSER
President, El Paso Natural Gas Company.

"The key to the high standard of living in this country is our highly developed use of its energy resources. Using resources of oil and gas, instead of hoarding them, we will have a system so developed that when these resources are exhausted we will be able to substitute in their place the synthetic fuels made from coal and shale and, therefore, maintain for the maximum time our high standard of living."

WILLIAM C. MULLENDORE
President, Southern California Edison Company.

"Whatever upward adjustment is made in our rates, the consumers' dollar spent for our service will still buy the biggest bargain in the market. For the average residential consumer the increase sought will be but a very small fraction as compared with other increases already suffered in the family budget. The electric bill is now less than one per cent of the entire cost of living and that will continue to be true."

EUGENE C. PULLIAM
Publisher, The Indianapolis News.

"Our deadly enemy isn't Communism, but bureaucratic Socialism."

ROBERT L. MINCKLER
President, General Petroleum Corporation.

"We must restore confidence in government by establishing and maintaining decency in government, and we must restore our ancient faith in ourselves by strenuous rejection of the idea of dependence upon government for our economic welfare."

ALEXANDER M. BEEBE
President, Rochester Gas & Electric Corporation.

"As our tax burdens grow heavier, it becomes increasingly important that they be fairly distributed. Much has been said about tax loopholes. It is our belief that it is vital for the welfare of our country that these loopholes be closed and that special privilege to a few be stopped."

CHARLES E. WILSON
Director, Office of Defense Mobilization.

"Here and now, we must decide for ourselves the price of freedom. Each of us must decide in his own heart whether he will do his part niggardly or magnificently. We must decide whether we will be greatly patriotic or whether we will be meanly partisan for ourselves or for any group or class."

LEWIS HANEY
Professor of economics, New York University.

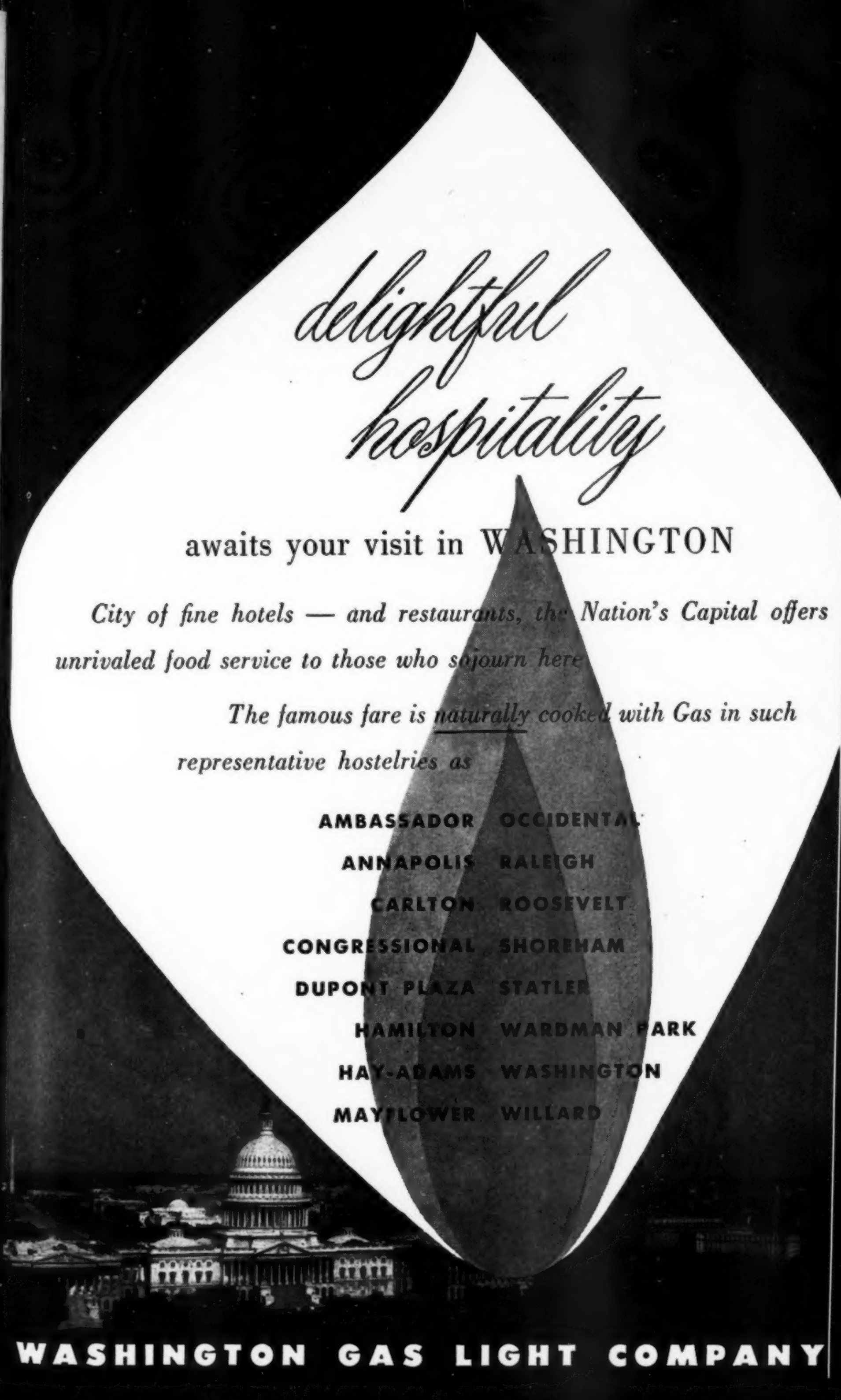
"Who pays the [Federal] debt? All of us pay. We are paying now. The order to cut our consumption of copper and aluminum is taking automobiles, houses, and appliances from us. The boost of 10 per cent or more in our income taxes is paying the debt. The 50 per cent rise in prices since 1939 is a payment on the debt."

BRUCE BARTON
Columnist.

"Time, which changes all things, 'has,' to quote Justice Oliver Wendell Holmes, 'upset many fighting faiths.' It can and will, with our help, eventually upset Communism. Provided, that in our hurry for world salvation, we do not commit national suicide by draining our own land of its resources and the veins of our sons of their blood."

GWILYM A. PRICE
President, Westinghouse Electric Corporation.

"The liberal intellectual has lifted a lid from a Pandora's box and loosed forces on the world that he did not expect, does not understand, and cannot control. It is bitterly ironic that the distinguishing mark of so many of our best educated, most articulate people has been an appalling ignorance of our traditions and of the simplest economic truths. That ignorance has given rise to economic error on the grand scale and to events that reduce bad effects of the machine to mere triviality."


delightful hospitality
awaits your visit in WASHINGTON
City of fine hotels — and restaurants, the Nation's Capital offers unrivaled food service to those who sojourn here.
The famous fare is naturally cooked with Gas in such representative hostelries as
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ANNAPOLIS
CARLTON
CONGRESSIONAL
DUPONT PLAZA
HAMILTON
HAY-ADAMS
MAYFLOWER
OCCIDENTAL
RALEIGH
ROOSEVELT
SHOREHAM
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WARDMAN PARK
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WASHINGTON GAS LIGHT COMPANY

from gas field to house service it's CLEVELANDS ALL THE WAY

For 30 years the gas industry across the nation has picked CLEVELANDS for the full spread of gas trenching work—from the big CLEVELANDS out in front on the transcontinental pipelines to their smaller brothers on gathering lines in the field and house services in the cities. This continuing acceptance is based on owners' experience that no matter how tough the soil and terrain conditions, no matter how cramped and difficult the digging locations, no matter how tight and scattered the schedules—CLEVELANDS can be relied on for a better, faster and cheaper job. Get the full story today. See your local distributor or write The Cleveland Trencher Co., 20100 St. Clair Avenue, Cleveland 17, Ohio.

IT'S BEEN . . .

A Healthy Growth!

• The increased demand for natural gas . . . coupled with our firm desire to render the best service at the most equitable rate . . . has brought about a healthy growth in our company since its organization in July, 1945.

Greatly improved service is now being offered to over 85,000 gas customers in Indiana, an increase of 42% in the six year period, while operating revenues have increased 140% in the same period.

We wish to pay particular tribute to each and every one of our employees for, without their valuable cooperation, it would be impossible to supply our customers with the better service they now enjoy.

We extend our hearty welcome to those attending the 33rd annual convention of the American Gas Association at St. Louis. We are proud to be a part of AGA and to participate in the growth of the GAS industry.

We are telling our customers . . .

It's Better... It's GAS

INDIANA GAS & WATER CO., INC.

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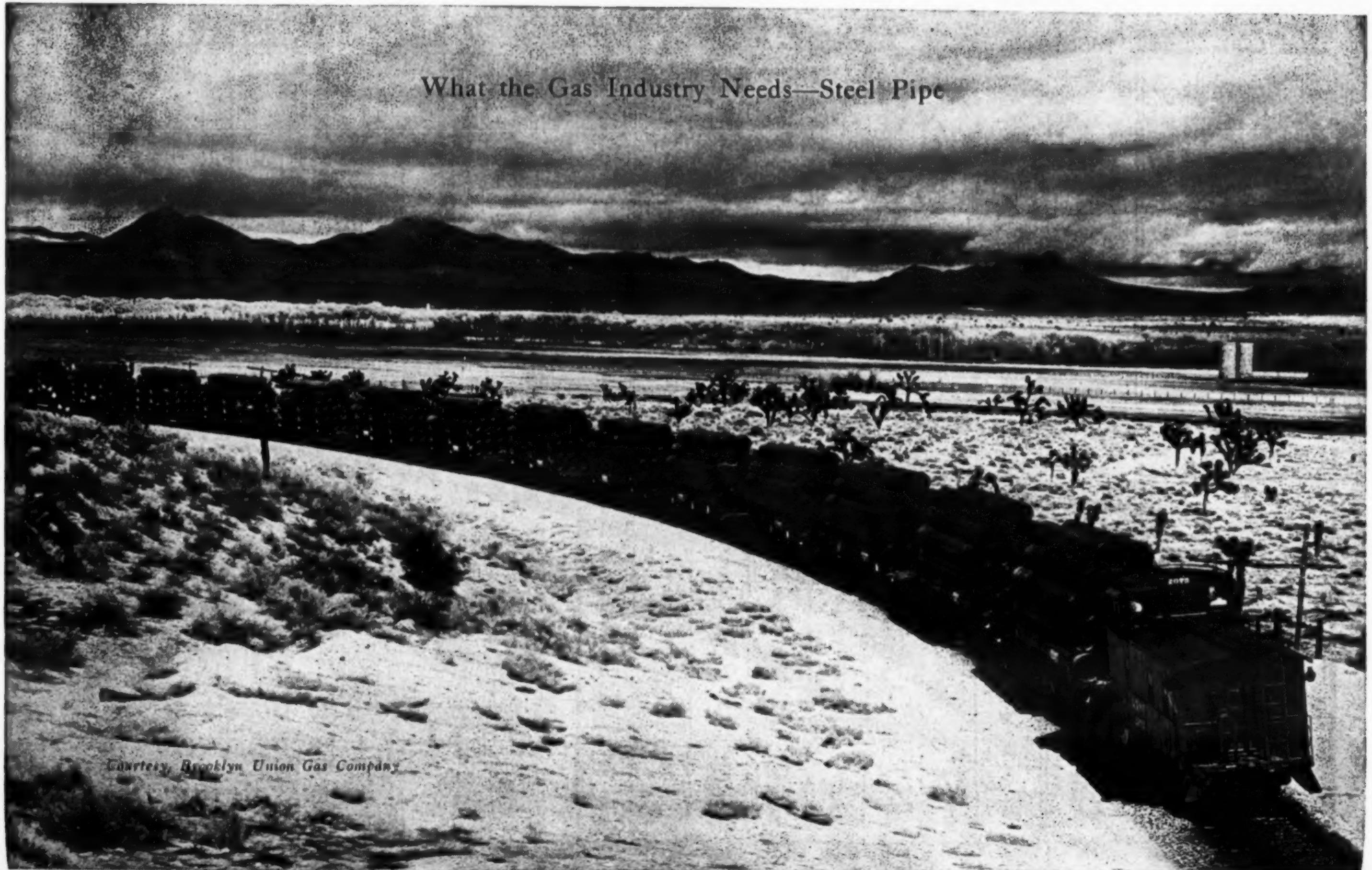
Utilities Almanack

October

25	Th	¶ *North Carolina Independent Telephone Association begins annual convention, Pinehurst, N. C., 1951.*
26	F	¶ *American Institute of Electrical Engineers ends fall general meeting, Cleveland, Ohio, 1951.*
27	Sa	¶ *New England Gas Association will hold safety conference, Boston, Mass., Nov. 8, 1951.*
28	S	¶ *Life Insurance Advertising Association begins annual meeting, Williamsburg, Va., 1951.*
29	M	¶ *South Carolina Independent Telephone Association begins annual convention, Columbia, S. C., 1951.*
30	Tu	¶ *Mid-Southeastern Gas Association will hold meeting, Raleigh, N. C., Nov. 8, 9, 1951.*
31	W	¶ *Southeastern Electric Exchange begins annual sales conference, New Orleans, La., 1951.*

November

1	Th	¶ *Pennsylvania Electric Association, Prime Movers Committee, begins fall meeting, Johnstown, Pa., 1951.*
2	F	¶ *Virginia Independent Telephone Association ends 2-day annual convention, Roanoke, Va., 1951.*
3	Sa	¶ *Michigan Association of Broadcasters ends 2-day meeting, Detroit, Mich., 1951.*
4	S	¶ *Northwest Public Power Association, Accounting Section, will hold meeting, Olympia, Wash., Nov. 8, 9, 1951.*
5	M	¶ *American Petroleum Institute begins annual meeting, Chicago, Ill., 1951.*
6	Tu	¶ *New Jersey Utilities Association will hold annual meeting, Absecon, N. J., Nov. 15–17, 1951.*
7	W	¶ *Oklahoma Telephone Association begins 2-day annual convention, Oklahoma City, Okla., 1951.*


What the Gas Industry Needs—Steel Pipe
Courtesy, Brooklyn Union Gas Company

Public Utilities
FORTNIGHTLY

VOL. XLVIII, No. 9 OCTOBER 25, 1951

Gas Industry Advances Despite Obstacles

Facing multiple complications growing out of the defense emergency, the progress of the gas industry is clearly demonstrated by its current record of expansion. Temporary obstacles, such as steel shortage, are regarded as challenges rather than barriers, as will be seen in this inspiring message.

BY D. A. HULCY*
PRESIDENT, AMERICAN GAS ASSOCIATION

IN common with other industries, the gas utilities underwent a number of changes in the economic picture of the nation during 1951. A minor boom was in force in the first quarter of the year. Gas companies and gas appliance manufacturers achieved new sales records of gas and appliances. Credit restrictions, higher taxes, and increased living costs retarded consumer buying in the second quarter. Shortages of steel and other materials in the third quarter restricted appliance production and limited construction of new facilities and plant expansion in the gas industry. But despite these obstacles there is every indication that the gas utilities will add more than 750,000 new customers in 1951 to the more than 28,000,000 customers now being served. Sales of utility gas to ultimate customers this year are expected to exceed those of 1950 by at least 15 per cent.

*For additional personal note, see "Pages with the Editors."

Last year was a record-breaking one for the gas industry. The gas utilities reached new high levels in customers served, total sales of gas, and in total revenues. Gas appliance manufacturers sold more than 3,100,000 ranges, a new record. Water-heater sales also climbed to a new level when 2,100,000 units were sold in 1950. Sales of gas refrigerators, clothes dryers, and gas air-conditioning units passed all previous marks. More than 1,000,000 gas space-heating units were sold last year.

THE gas industry was not content with these records. Stimulated by the intensified advertising and promotional campaigns carried on under the American Gas Association's Promotion, Advertising, and Research (PAR) plan, sales of gas ranges, gas water heaters, and other appliances ran 25 per cent ahead of 1950 in the first four months of 1951. The continued rapid expansion of our natural gas pipeline systems enabled gas utilities to serve more customers, though the supply never quite caught up with the demand.

The tide of prosperity rose steadily for the first five months of 1951. Then it began to ebb. Scare buying was over and credit restrictions put a brake on purchases of appliances and other durable goods. Shortages of materials and governmental controls limited production of appliances. Taxes and increased costs of living intensified competition for the consumer's dollar. Merchandise began to pile up in warehouses in the second quarter of the year.

Basic conditions throughout the industry were favorable. A survey by the AGA Statistical Bureau showed the gas industry planned on spending about $4.59 billion for new construction during the five years ending with 1955. More than $1.25 billion of this amount was earmarked for 1951 to enable the gas companies to serve new customers and to take care of increased demands of present customers.

Other surveys showed the demand for gas service was not abating. A large majority of the new homes built in 1950 within gas company franchise areas chose gas for one or more residential uses. In territories where builders and home owners did not have to pay for the cost of extending gas mains, the ratio in favor of gas was very favorable.

The demand for gas for house heating continues to exceed the ability of the gas companies to serve all new customers in several areas, necessitating some restrictions on new services in critical areas. The construction plans for added facilities to help meet this tremendous demand had to be limited to some extent because of the need for vital materials for the nation's defense program. But in spite of these difficulties, the gas industry hopes to add more than 800,000 new gas space-heating customers in the 1951-52 heating season.

IN the third quarter there was some brightening of the economic outlook for the gas companies. Easing of the credit regulations enabled the gas industry to cash in more extensively on its promotional efforts, though intense selling effort still is needed to move appliances. The threat of blanket restrictions on sales of new services of gas has not materialized

and those companies having sufficient supplies of gas can obtain authorizations to add new customers.

Peace agreements in Korea will brighten the immediate situation, but the national defense effort must go on, at even an accelerated pace. This will continue the present shortages of materials. Though it is too early yet to estimate the real effect of the defense program on the expansion plans of the gas industry, it is evident that there must be some curtailment. The Petroleum Administration for Defense has stated that there will not be enough steel and other materials to serve the defense needs and civilian requirements as well.

But the gas industry, by its continued support of the association's PAR plan, has demonstrated its faith in the industry's future. Now in its sixth successful year, voluntary subscriptions by gas utility companies have raised more than $1,700,000 for the gas industry to expend this year.

Approximately $600,000 a year now is being spent on gas industry research projects. New methods of making gas are being explored. The characteristics of the gas flame are being studied from all possible viewpoints to the end that both fuel and appliances will achieve the highest point of efficiency. Under a project now under way, more than 2,000 automatic gas ranges will be field tested to ascertain the best type or types of single point ignition systems that will ignite all burners from a single switch. This will insure a "cool" gas range and one that will not consume any energy while not in use. Heavy demands for gas house heating create peak loads. Stand-by fuels are needed to meet these peaks and much time and effort are being devoted under PAR plan research to the interchangeability of fuels so that change-overs to these stand-by fuels can be made efficiently.

No reduction is contemplated in the size or the intensity of the advertising and promotional efforts under the PAR plan. National advertising will continue to bring the story of the attributes of gas and gas appliances to Mrs. America. Co-ordinated, industry-wide promotional campaigns such as the Old Stove Roundup and the Spring Festival will continue to augment the power of our national advertising by the unified advertising and promotional force of the gas utility companies, the gas appliance manufacturers, and the dealers.

Natural gas will be brought to new areas. The metropolitan New York and New Jersey areas and the South Atlantic coast states now are receiving natural gas in substantial quantities. One natural gas transmission line is well on its way to serving New England. Additional systems will bring natural gas to this highly industrialized area as soon as materials are made available to the pipeline companies.

In the light of these many encouraging factors, it is difficult to predict anything except an optimistic outlook for the gas industry, barring any unforeseen drastic change in our national economic picture. Our industry should register moderate gains in 1951 and should forge ahead to new records next year.

The Gas Industry and PAD

The Federal official responsible for the administration of defense material controls as they affect the natural gas industry explains the organization of the control machinery set up by the Petroleum Administration for Defense.

By C. P. RATHER*

ASSISTANT DEPUTY ADMINISTRATOR, PETROLEUM ADMINISTRATION FOR DEFENSE

THERE is in the Defense Production Act's "Declaration of Policy" a long, cumbersome, but important sentence that reads:

> It is the intention of the Congress that the President shall use the powers conferred by this act to promote the national defense, by meeting, promptly and effectively, the requirements of military programs in support of our national security and foreign policy objectives, and by preventing undue strains and dislocations upon wages, prices, and production or distribution of materials for civilian use, within the framework, as far as practicable, of the American system of competitive enterprise.

That sentence is significant in any assessment of the work of the Petroleum Administration for Defense, of which I am an assistant deputy administrator in charge of gas transmission and distribution operations. For the sentence defines in its own way the complex obligations that rest upon PAD.

There is a primary obligation to promote the national defense.

There is a secondary obligation to prevent, "as far as practicable," undue strain on the normal civilian economy.

For every part of PAD this double duty presents momentous problems. There is a delicate balance needed between the two requirements, and that balance is not easy to achieve. But the gas branch finds the situation peculiarly challenging in view of the industry tradition with which it must work.

THE gas industry has always proceeded, quite properly, on the assumption that it was the domestic consumer, the average householder, who came first. Industrial consumers, even those that used large volumes of gas,

*For additional personal note, see "Pages with the Editors."

were strictly of secondary importance. That is why the industry has always had interruptible contracts with the industrials, providing for cutoffs of service whenever needed to assure sufficient supplies for that primary market, the domestic user.

But in PAD, obviously, the emphasis has had to be changed. We have been required by the terms of the act that establishes us to give first attention to the national defense. And that has meant often that we have been moved to actions that give priority attention to industrial customers, for these manufacture the very weapons of defense. Undoubtedly we shall be moved to other such actions in the future. If gas is needed to keep a vital steel mill in operation or for any other of the many demands of the defense effort, we are going to have to try to get that gas for such use. Except that failures in service to the domestic user who is dependent upon gas for heat and food must be avoided, all other considerations will have to be subordinated.

This has been no easy job, and it is not going to get easier. But it is a job that has to be done, for it may affect the nation's survival itself.

For this task, there has been set up within PAD a gas transmission and distribution branch with whose responsibilities many are still unfamiliar. In brief, the PAD setup looks like this:

Most natural gas production is, of course, inextricably linked with the production of liquid petroleum. A wildcatter starting to sink a well can only hope that it will not be a dry hole, that it will produce gas, or petroleum, or both. It is impossible, therefore, to attempt to separate responsibilities in the field of production, saying, "This string of casing is for gas and that for oil." Since PAD has quite enough to do in other quarters, it has not attempted the impossible. It has put administrative responsibility for the efficient and equitable distribution and use of oil country tubular goods for both oil and gas in a single division, the production division.

There are, of course, some cases where natural gas production is in fact separate and distinct from the production of crude oil. Dry gas and gas condensate fields, for instance, produce no crude oil. In these cases responsibilities with respect to the gathering, compressing, processing, and treating of the gas have been given to another operating division, the natural gas production and processing division. This division is also responsible for all phases of the processing of casinghead gas.

This pattern of operations is substantially that followed in the Petroleum Administration for War during World War II.

In matters concerning the manufacture of gas and the transmission and distribution of all gas, natural and manufactured, the pattern has been changed, however. In World War II these were the responsibilities of the War Production Board's Office of War Utilities. Today they are vested in PAD. Three operating divisions handle the day-by-day administrative work in the field—the gas planning division, the gas operations division, and the gas facilities division.

The gas planning division is a pro-

PAD's Problems

"PAD's *major battle ever since controls over materials were established early this year has been to get the materials needed by the oil and gas industries for essential expansion. It has not, unfortunately, been too successful a battle to date. PAD, of course, is in a kind of competition with every other claimant defense agency in Washington to get materials allocations.*"

gram group concerned with long-range estimates and planning. It forecasts future supplies of and demands for gas and recommends the steps to be taken to assure that adequate supplies are available where and when they are needed.

The gas operations division is charged with seeing to it that the existing facilities for transmission and distribution of natural gas and the manufacture and distribution of artificial gas are used to promote the defense mobilization goals.

The gas facilities division is primarily concerned with the construction of additional facilities for gas transmission and distribution. This division must prepare and evaluate claims for materials needed either to start new construction projects or to complete those already under way. It also has to screen those projects to make sure that PAD will not, in this time of short material supply, be asking for any materials except those that are absolutely essential.

In general, the facilities division must, in light of PAD's defined responsibilities, work always with the thought that service to the armed forces and the Atomic Energy Commission must be given top priorities. And that means, of course, that the industries that make the essential materials required by both the armed forces and the AEC must be given such priorities.

THERE are, broadly speaking, four classifications into which projects fall:

First, supply. This would cover gathering lines, transmission laterals

connecting new supplies to existing main-line transmission systems, and plants for the manufacture of gas.

Second, projects that do a big job with relatively little use of critical materials. This would cover gas storage projects, compressor stations on existing pipelines, and other projects to help meet peak-load requirements.

Third, projects to maintain existing service. This would include reinforcing mains in city distribution systems, transmission service lines into areas dependent upon gas, or any other project similar in nature.

Fourth, projects to extend service into new areas. This would include the extension of transmission or distribution service into any area that was not dependent on gas or the use of service connections for consumers not dependent on gas.

PROJECTS generally are assigned priorities in this descending order. A long wait may be involved in these days for those projects at the bottom of the scale.

When this long wait develops, the answer is simple: There is not enough steel.

PAD's major battle ever since controls over materials were established early this year has been to get the materials needed by the oil and gas industries for essential expansion. It has not, unfortunately, been too successful a battle to date. PAD, of course, is in a kind of competition with every other claimant defense agency in Washington to get materials allocations. In the competition it has had at least one major disadvantage. The chief needs of the oil and gas industries are for plate steel since plate is used in the fabrication of pipe. But plate is needed as well in ships and planes and tanks and in the new mills that have to be constructed if the supply of steel is to be expanded. The oil and gas industries, then, must vie with top-priority projects whose importance in the national defense is obvious.

A FEW figures tell the story of what has happened. In the third quarter of this year the estimated requirements of steel for gas transmission and distribution were 855,261 tons. But the Defense Production Administration, the top allocation authority, gave PAD only enough steel so that PAD in its turn could allocate only 533,000 tons for this purpose. That was only 62 per cent of the minimum requirements. For the fourth quarter PAD claimed 676,000 tons of steel for gas transmission and distribution. It had available for allocation from the DPA only 509,201 tons, or 75 per cent of minimum requirements.

These allocations, incidentally, point up a problem on which I had occasion to speak before the Kentucky Oil and Gas Association in Ashland, Kentucky, on June 21st this year. "There was some concern in the gas industry," I said at that time, "that it would be swallowed up by the oil industry or its problems more or less ignored if responsibility for its defense mobilization was placed in PAD instead of in a separate agency. I wish to take this opportunity to say publicly that such concern can be forgotten. I have yet to find a situation involving the utilization of critical materials as between oil or gas in which the essentiality of the respective projects

was not the primary consideration in determining the allocation of the material. Whether it was gas or oil was of no significance. It is my considered opinion that the gas industry is fortunate to be under PAD and have the advantage of the experience of those people, formerly in PAW and sometimes referred to as 'retreads,' to assist in presenting its case in the defense effort."

Nothing that has happened since June has caused the slightest change in that judgment.

In the third quarter gas received 75 per cent of its estimated requirements where PAD as a whole received 62 per cent. Obviously, the necessity of completing important gas lines before winter was recognized and assistance was given ahead of other projects where time was not so important. The gas industry was the beneficiary. Now, serious problems are developing in oil transportation which will have to be met. Under such circumstances "relative essentiality" will again be the deciding consideration and oil transportation may be the beneficiary.

This is not to pretend that PAD is doing a perfect job. Perfection will forever remain beyond the grasp of men. But at least we in PAD are trying. There are many things we should like to be doing that we are not, but we have neither the staff nor the time to accomplish them.

Everyone at PAD is fully conscious that ours is a strictly temporary agency. Those of us who are from industry count strongly on that fact, being anxious to get back to our own industry jobs as soon as possible. But PAD is enlisted for the duration of the need. We who are inside the agency can, only with the co-operation of you in industry, do the job that lies ahead.

The Usefulness of Capital

"Capital is the harness that puts energy to work. The question whether private capital will be permitted to perform its historic function in the years ahead is the biggest social problem in America. You can't drill four miles deep into the earth for petroleum by hand. You have got to use capital, that is machines. . . .

"Business . . . is mankind's greatest benefactor and the principal supporter of the government. Through ignorance of the horse-power facts of life, tension is increasing between the owners of tools and the users of tools. This class struggle is dividing our people. . . .

"Because up to now the American has rejected the poisonous doctrine of the class struggle, we have, by serving each other, served all mankind."

—L. S. Wescoat,
President, Pure Oil Company.

State *versus* Federal Control Of Natural Gas

About the only important change of interest to utilities in the 1951 edition of the revision of the Defense Production Act was the so-called "Bow amendment" permitting state regulatory commissions to handle the distribution of natural gas in their own areas in the event of supply shortage. Here is an article by the author of this legislation explaining its background and purpose and the intent of Congress in approving it.

By the Honorable FRANK T. BOW*
U. S. REPRESENTATIVE FROM OHIO

In the midst of the celebration of this past Fourth of July holiday, another sort of a giant firecracker was exploded without warning under the natural gas industry. It was learned that the Petroleum Administration for Defense, a temporary division of the Department of Interior, was contemplating a nation-wide ban that would restrict natural gas companies from supplying gas to any new heating customers for heating homes or to any large volume industrial customers without the approval of PAD.

The heating restrictions were to cover both new gas installations and conversions. According to Bruce K. Brown, Deputy PAD Administrator, the reason for such an order was that inadequate amounts of steel available made it impossible to complete essential gas pipelines. He declared that unless something was done promptly a serious gas shortage would confront the nation next winter.

Seldom has word of an impending government order spread such mass consternation throughout so large a segment of our industrial United States. In a few score years the natural gas industry has grown until today it has become the sixth largest industry in the nation. Allied with it are millions of people and thousands of businesses both large and small. Thousands of industries use gas-fire

*For additional personal note, see "Pages with the Editors."

equipment. Many thousands earn their living selling and installing gas appliances. Millions now use gas to heat their homes. To abruptly impose such a freeze on so large a portion of business and people would be to invite catastrophic consequences.

AFTER the first reaction of shocked disbelief, the industry rallied to fight for its life. A storm of protest and warnings burst about the ears of PAD as gas appliance manufacturers, dealers, and members of the allied trades assailed the far-reaching proposal. Spokesmen for Gas Appliance Manufacturers Association hurried to Washington to urge PAD to reconsider, and try to learn what was behind the ban.

It was found that the catalyst which had touched off the order was that one gas distribution system was undoubtedly going to be short on gas this coming winter. It had applied for some sort of restrictive ruling and instead of a localized ban, the proposed nationwide order had resulted.

But why, the gas appliance industry spokesmen asked, should the whole country be penalized for one such case? Intelligent restrictions were nothing new to the industry. It had operated under state restrictions during World War II and is doing so at the present time. Ever since the start of the present emergency, it had been limiting its manufacturing schedules and accumulating inventory in accordance with the anticipated limitations of gas usage imposed by defense allocations. But now to be suddenly and arbitrarily cut below these would be a damaging, if not fatal, blow to its operations. To be denied markets for their equipment would be a death blow to thousands of small businessmen. Additionally, the freeze would be a threat to the livelihood of a sizable portion of the nation's heating installation contractors and salesmen of dealers, and distributors' organizations.

It was evident that if PAD had set out to disrupt a goodly portion of the defense effort, it could not have done a better job. Its proposed order would cut off, when it was most needed, the fullest utilization of gas in industry. Indirectly it would strike at defense work by aiming a devastating blow at small businesses engaged in defense subcontracting. Thousands more would be hampered by inability to launch new operations dependent upon gas.

THE order would also affect the national housing program. Even under present restrictions, housing authorities have decided there must be constructed this year about 850,000 new dwelling units. Responsible surveys have established that more than one-half of these houses—to be exact, 57.4—are planned for gas heat. Only 28.5 for oil heat and only 4.8 for coal heat. Thus hundreds of thousands of home owners would be denied the benefits and economies of gas heat.

Referring to essential housing, one spokesman pointed out that "it is no exaggeration to say that if the extension of gas heating is curtailed, some of these essential dwelling units will never be built. Many are in areas where the only heating facility available is gas. Others are in regions where gas is simply the least costly fuel."

Another obvious result was that such an order would contribute to the shortage of other fuels. All the coal that can be handled by the railroads is now being distributed from the mines to the consumers. Oil reserves in the national picture—produced oil, not oil still in the ground — are no greater than normal seasonal requirements dictate. In fact, the oil outlook is particularly bleak since the shutting down of the world's largest refinery in Iran and the consequent cutting off of the immense oil supplies counted upon by the British and countries in northern Europe. During the last war, gas was used when other solid and liquid fuels were short. The PAD order would reduce its supply when it was most needed, thus further upsetting the balance of the entire fuel industry.

Commented one authority, "How many more costly mistakes must be made before it is learned that this enormous production machine of the United States is based on integrated industrial planning? Hacking away at one segment or another of the industrial picture can only diminish its output."

But aside from the personal tragedies and economic wreckage threatened by the order, perhaps the most disturbing aspect of the PAD proposal to those already concerned with the increasing centralization of power in Washington, was that it presented a direct attack on the sovereign rights of the individual states.

For many years, it has been customary for the state public service commissions to issue restrictive orders pertaining to the use of gas whenever such limitations were necessary. PAD was therefore apparently planning the duplication of a function now capably performed by the state commissions, which have long demonstrated their ability to issue regulatory orders whenever necessary to the public interest.

Viewed in a critical light, what PAD proposed would *ignore* existing state regulatory bodies and might even be viewed as usurpation.

I was first alerted to the proposed PAD order by a flood of telegrams from alarmed constituents in my state of Ohio, who had heard rumors of such a move. After investigating, I addressed a letter to the Honorable Oscar Chapman, Secretary of the Interior, protesting against any such order which would limit the use of natural gas in Ohio. I stated that the public utilities commission of the state of Ohio had through its own action placed limitations on new installations and construction and done an admirable job with the administration of its orders.

It was my opinion, I declared, that state regulatory agencies are in a better position to handle matters of this kind where they exert jurisdiction than

¶ "The *vital importance of the natural gas industry to our defense effort and national economy requires that steel allocation programs be re-evaluated and additional steel be made available for the gas pipelines as soon as possible."*

would be an administration at Washington level. I further suggested that at least in these states where public utility commissions have acted that they be exempted from any order that might be issued by PAD.

THE only reply I received was the same that representatives of the industry and the chairmen of the state public service commissions were getting in meetings with the PAD officials—that shortage of steel for pipelines required such an order unless there was to be a gas shortage this winter.

This was far from satisfactory. In view of the threatened results, it seemed inconceivable that PAD would not have given more consideration to its proposal. Otherwise, what was behind it? Further study convinced me that this was nothing more than an attempt by the Interior Department to move further into the field of public utilities and private pipeline companies.

At this point, a happy circumstance intervened. At that moment the House of Representatives was considering amendments to the Defense Production Act under which PAD would have to issue its order. This made it possible for me to introduce an amendment which would be germane to the legislation under consideration. I therefore immediately prepared an amendment to the Defense Production Act which would preserve the historic right of the several states to control the distribution of natural gas within state boundaries. It read as follows:

> No rule, regulation, or order issued under this act which restricts the use of natural gas (either directly, or by restricting the facilities for the consumption of natural gas, or in any other manner) shall apply in any state in which a public regulatory agency has authority to restrict the use of natural gas and certifies to the President that it is exercising that authority to the extent necessary to accomplish the objectives of this act.

ENLISTING support for the amendment, I brought the intent and consequences of the PAD order to the attention of my colleagues in the House of Representatives, the chairmen of state public service commissions, and the governors of the states threatened.

The broad and unsatisfactory PAD order, I pointed out, clouded the authority of the state public utility commissions which have demonstrated their ability to handle distribution of natural gas to the American public in both normal times and in emergencies. The rights of these commissions and of the states should not be taken away by any Federal agency.

Furthermore, I warned that the proposed ban on new users of natural gas would seriously harm or put out of business some 50,000 retail and service businesses which depend for their livelihood on sales, installation, and upkeep of home and industrial heating appliances, and approximately 300,000 workers for dealers and manufacturers. Financial losses inherent in such action are estimated conservatively to exceed $100,000,000, involving not only industrial organizations but banks as well.

The small businessman, already hard hit by the mobilization program, should not have his troubles compounded by an unnecessary Federal order, especially when specific emer-

The Basic Problem of Steel Pipe

". . . it would seem that more steps should be taken to help the nation take advantage of its tremendous natural gas reserves. With the country in the midst of an enormous defense effort, our supplies of coal, oil, and electric power are being strained to the utmost. Obviously, the real answer to the gas supply problem for certain areas is the availability of additional steel pipe. But just as obviously, this cannot be solved by an order from the Department of the Interior."

gency shortages are handled every day by already duly constituted state authorities.

FROM across the country the prompt response to my stand was most gratifying. Governors, state corporation commissions and public utility commissions, Congressmen, and businessmen, both large and small, wrote and telegraphed me that they were in thorough accord with my views.

"Feel your amendment is highly important. We heating contractors have been taking a terrible beating this year," wired one Pittsburgh contractor.

"Wish to express my support . . . am definitely opposed to socialistic controls such as regulation contemplated by PAD," read another.

"In case freeze of this type were to go into effect, our entire capital investment, both in inventory and fixed assets, would be frozen indefinitely. It would also mean the unemployment of all our personnel — more than 100 people. This would be nothing short of tragic. . . ."

"There is no reason why the Federal government should usurp prerogatives of the state public service commissions whose long-range records are excellent in restricting use of gas during emergencies and times of fuel shortages."

Late in the evening of July 20th, the Bow amendment came up before the House of Representatives and was approved by an overwhelming majority.

Explained one member of Congress, "This (PAD order) is the pernicious type of government regulation which it is the duty of Congress to oppose and stop."

"There is definitely no necessity at

this, or any other time, for the Federal government to step in and superimpose authority over the states. The state public service commissions are better informed and closer to local problems than government officials operating from Washington ever will be," he added.

"It is very apparent," another Congressman declared, "that this regulation was not considered very thoroughly and that its definite purpose and intent were deliberately distorted and confused. There were a number of political considerations involved, and certain selfish groups were attempting to use the power of the Federal government to protect or advance their interests."

On July 31st the amendment was approved by Congress and became part of the Defense Production Act which is now the law of the land.

Astonishingly enough, however, PAD still did not give up. Under heavy fire from GAMA and trade groups and members of Congress, it had earlier eliminated the West coast states and all but a few states west of the Mississippi river after it was forcefully pointed out by state public service chairmen and its own gas advisory committee that these states were either gas producing themselves or their facilities were in excess of the winter demand.

Under continuing pressure, PAD proposed that the order be reduced to 15 states and the District of Columbia. After the Bow amendment became a law, it was felt that PAD might drop the order altogether, but instead it issued it anyway to include New York, Michigan, Wisconsin, Ohio, Pennsylvania, Virginia, West Virginia, Kentucky, Maryland, Delaware, New Jersey, Massachusetts, Rhode Island, Connecticut, and New Hampshire.

This action deliberately spurned the provision written into the National Defense Production Act (HR 3871), with the specific view of preventing Federal usurpation of states' rights, duplication of adequate state regulatory agencies and powers, and more centralization of controls in Washington. It was in effect a flaunting of the intent of Congress. On August 8th, I asked to be inserted in the *Congressional Record* a letter I had received from Senator John Bricker of Ohio which dealt with the ever-present danger of the attempt of several bureaus to flout the will of Congress and continue upon their roads to regulation and eventual socialization. Senator Bricker's letter read as follows:

U. S. SENATE

COMMITTEE OF BANKING AND CURRENCY

Dear Frank:

I want to take this opportunity to congratulate you on the fine work you did in persuading the House of Representatives to accept your amendment to the Defense Production Act, which will enable state public utility commissions to continue to regulate the use of natural gas.

As you know, there was no comparable amendment in S 1397, the Senate's bill to amend the Defense Production Act. In my judgment, however, the Senate would have adopted an amendment identical with your own had it been aware of the plan of the Petroleum Administration for Defense to invade a field of natural gas regulation in which states' regulatory commissions are better qualified and are already exercising jurisdictions.

I have no doubt that the majority of the Senate conferees on the bill to amend the Defense Production Act shared this view when they accepted the Bow amendment. Your amendment offers state governments an opportunity to demonstrate that they can play an important rôle in the defense effort. If limitation orders on the use of natural gas continue to be administrated efficiently and economically by the states, we may then consider what other defense activities could be performed better at state and local levels. The possibility of serious natural gas shortages this winter in particular localities presents a real challenge. I am confident that the state regulatory commissions will meet these shortages with regulations that are adequate, selective, and flexible and which subject business, labor, and home owners to a minimum of inconvenience. All this will be in happy contrast to the maladministration which inevitably attends the centralization of regulatory authority here in Washington. Today's *New York Times* carried a story on page 38 which indicated that the Petroleum Administration for Defense plans to pressure the public utility commissions of 15 states into adopting its own proposed order prohibiting the use of natural gas. If this report is correct, it means that the clear intent of Congress is being flouted. I hope that the public utility commissioners who are to meet with the officials of the Petroleum Administration for Defense realize that Congress had more faith in their regulation than that proposed by the PAD. If the Secretary of the Interior continues to try to usurp state authority in violation of the clear intent of Congress, I think we should consider divesting him of his responsibility of the Defense Act of 1950.

Sincerely yours,

John W. Bricker (signed)"

As Senator Bricker predicted, the PAD "slowdown" order was issued on August 15th. The net effect of the order, however, was practically nil since any or all of the 15 states affected can free themselves from its restrictions by certifying to the President of the United States that they are taking the necessary steps to regulate gas within their boundaries, as provided for in the Bow amendment.

Meanwhile, it would seem that more steps should be taken to help the nation take advantage of its tremendous natural gas reserves. With the country in the midst of an enormous defense effort, our supplies of coal, oil, and electric power are being strained to the utmost. Obviously, the real answer to the gas supply problem for certain areas is the availability of additional steel pipe. But just as obviously, this cannot be solved by an order from the Department of the Interior.

PAD is on record as estimating that the amount of line pipe allotted to the natural gas industry for the third quarter of this year was insufficient to complete necessary projects. It has stated that steel available for gas transmission lines and distribution lines is only 59 per cent of the absolute minimum needs as determined by PAD.

The vital importance of the natural gas industry to our defense effort and national economy requires that steel allocation programs be re-evaluated and additional steel be made available for the gas pipelines as soon as possible.

Is Gas Rate Regulation Realistic?

With the declining value of the dollar both the regulators and the regulated are asking questions about the equity of our prevailing system of fixing public utility rates.

BY STUART M. CROCKER*
CHAIRMAN OF THE BOARD, THE COLUMBIA GAS SYSTEM, INC.

SOMETIMES it seems as if public utility regulation in the United States were moving in circles. But actually these developments reflect an effort on the part of both the regulators and the regulated to harmonize the process of rate making with the economic changes resulting from the vagaries of dollar values through the years. Needless to say, we have not found the answer yet. If anything, the volatile inflationary era through which we are passing today has posed for many regulatory commissions the need of a fresh examination of their approach to rate fixing.

Just before the turn of the century, we had the state legislatures attempting to fix rates by legislative fiat—railroad passenger fares in Nebraska at so much a mile, manufactured gas rates in New York at a dollar a thousand cubic feet. The U. S. Supreme Court put an end to that process by calling for more exacting standards of regulation in the celebrated Smyth *v.* Ames Case in 1898. Then regulation moved into a new phase, rate fixing under judicial supervision. During the last two decades we entered a third phase. Regulatory commissions have now been delegated almost complete discretion over rate making.

THUS, the regulatory rule over utilities has passed through the constitutional branches — legislative, judicial, administrative. Now, once more questions are being asked as to whether our regulatory machinery is working successfully. And if it is not, where else can we turn for remedy unless it be the legislatures? Full circle? Perhaps. But the important thing is

* For additional personal note, see "Pages with the Editors."

finding the answer, or at least some reasonably workable solution.

LET us consider our circular evolution in regulation another way. In Smyth *v.* Ames, the railroads in Nebraska were seeking rates based on their outstanding capitalization, which should, very roughly at least, approximate investment. During the period when the courts were active in supervising rates, reproduction cost came into prominence as a measure of the rate base. More recently, especially before Federal commissions, such as the Securities and Exchange Commission and the Federal Power Commission, there has been a strong trend toward the original cost concept of accounting and rate making.

Today, with the purchasing power of the dollar drifting lower and lower, once more we hear questions as to whether a strict original cost basis is realistic. We hear financial advisers warning about the need for fixing rates that will attract the investor. And if we have to fix rates on that basis, wouldn't we be coming pretty close to another full circle?

The real trouble, of course, lies in the historic deterioration of the dollar itself. If the dollar would stay put long enough, any reasonable formula, intelligently applied, might work satisfactorily. But it seems to be the nature of a formula to become hardened and rigid in its application after a period of use.

Unfortunately our wandering dollars do not obey precedent. And our independent investor, who has the right to say where he will place those dollars, is not subject to the edicts of our regulatory commissions. If he does not like the results, he simply takes his dollars elsewhere and the public utilities are left to argue their problems with the commissions.

To illustrate what the combined effect of declining dollars and the prevailing rate formula has had on the gas business, I would like to use as an example that segment of the business with which I naturally am most familiar—The Columbia Gas System. The philosophy of our system management has been that the customers, the employees, and the investors are partners. Management is responsible for their respective interest. In the chart accompanying this article, we see how the residential customer, the employee, and the common stockholder have fared during the past decade. (See chart, page 548.)

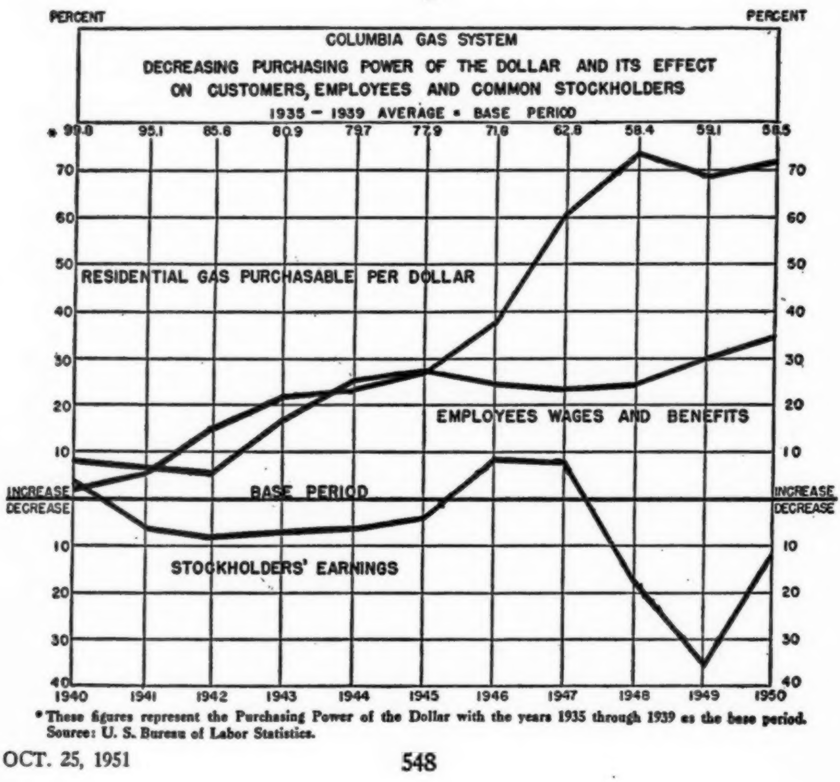
USING the period of 1935 through 1939 as a dollar value base, we have shown on this chart by percentage changes what has happened to these three partners in our enterprise. In doing this we have recognized the decreasing purchasing power of the dollar and have indicated at the top of the chart the present relationship of each year's dollar to the dollar of the base period.

Now let us take a look at the three groups, starting out with the residential customer. The price of residential gas today is approximately the same as it was during the base period so that, after we recognize the fact that he is paying for his gas today with a depreciated dollar, he is, in effect, receiving 72 per cent more gas for his money today than he was in the base period.

Next take a look at the employee.

He has not fared as well as the customer but average wages and benefits have increased steadily. In 1950, even when adjusted to reflect the depreciation of the value of the dollar, average wages and benefits were about 35 per cent more than they were in the base period. Just so there will be no misunderstanding as to how the employee has fared, let me relate the employees' figures to the more familiar measure —the cost of living. Comparing the 1950 figures with the same base period used on the chart, the index for employees' wages and benefits had risen for 1950 to 231, which was 60 points or 35 per cent greater than the increased cost of living for that period.

But now look at the third partner, the common stockholder. He started out all right in 1940 but then came World War II. Tax rates were increased and an excess profits tax was enacted which imposed an unfair tax burden on many utilities. This inequity was corrected in the current excess profits tax, but during the war years of 1941 through 1945, stockholders' earnings were hit severely. After the excess profits tax was repealed in 1946, his earnings improved somewhat; but then came our $204,000,000 construction program. This time he was really hurt.



* These figures represent the Purchasing Power of the Dollar with the years 1935 through 1939 as the base period.
Source: U. S. Bureau of Labor Statistics.

CURRENTLY his earnings have again improved somewhat, but even today his earnings per share of common stock, when adjusted for the depreciation of the dollar, are 12 per cent less than they were in the base period. Obviously, if these three partners are to receive comparable treatment, something must be done for the stockholder. His earnings must be increased.

I would like nothing better than to be able to tell our more than 76,000 Columbia stockholders — men and women who have invested hard cash in our enterprise—that they will receive fair treatment from all regulatory bodies.

Let us turn now to the regulatory picture. Our system operates in seven states and its local operations are in general subject to the jurisdiction of the state regulatory commissions. In addition, many of our operations are subject to the jurisdiction of the Federal Power Commission. Regulation is nothing new. Utility companies have lived under it for many years, but one question has had no permanent answer.

What amount should a utility be permitted to earn? As we have already noted, over the years many methods of arriving at this answer have been tried — reproduction cost new, fair value, prudent investment, return on capital, and original cost—these are the ones which have been used most frequently.

Currently, the trend in the Federal courts seems to be that it does not matter which method is used as long as the "end result" is fair and equitable. This has been further amplified as meaning that a utility should be permitted to earn an amount which will permit it to retain its financial integrity, provide a fair return to its security holders, and attract new capital. I would not quarrel with this theory; but, since the "end result" can be subject to many interpretations, it still does not answer the question of what are proper earnings.

Many state regulatory commissions are approaching the problem in a manner which provides fair and equitable treatment to both the customer and the common stockholder. Other commissions, however, seem concerned mainly with the problem of keeping rates as low as possible, without much apparent regard for the future of the industry.

MANY people are obviously confused about the true earnings status of utility companies. In fact, this confusion is not limited to utility earnings but applies to the earnings of all corporations. You hear, all too frequently: "That company earned $100,000,000 this year as compared to $70,000,000 last year. It's too much."

What these critics fail to recognize is that these increases in dollar earnings must be related to increases in sales, which in turn have required increased investments in plant and inventory. When considering the earnings of corporations, such critics think in terms of dollars. *They do not think in terms of the purchasing power of those dollars.* Certainly, for all other purposes, everyone is complaining today of the increased cost of living.

If regulation is going to work successfully and equitably, it must recognize the rights of common stock investors. Stockholders are not a class

Is Regulation Moving in Circles?

"SOMETIMES *it seems as if public utility regulation in the United States were moving in circles. But actually these developments reflect an effort on the part of both the regulators and the regulated to harmonize the process of rate making with the economic changes resulting from the vagaries of dollar values through the years. Needless to say, we have not found the answer yet.*"

apart—for the most part they are individuals just like anybody else. And regulation must recognize the effect of the depreciation of currency on the purchasing power of earnings from common stock investments.

CERTAINLY no one today holds out any hope that the purchasing power of the dollar will soon be restored to its 1940 level. On the contrary, it appears that the downward trend may continue. This condition is recognized by labor, which has frequently received wage adjustments to offset the increased cost of living, and is preparing even now to ask for more. Why not give similar treatment to the common stockholders of a utility? For the dollars which he invested last year or ten, fifteen, or twenty years ago, is it fair that he should receive a return which does not recognize the depreciation in the value of the dollars he now receives?

LET us for a moment consider the peculiar position of a natural gas utility. It is sometimes referred to as a legalized monopoly; but just what does that mean? It certainly does not mean that it is free of competition. True, it does not ordinarily compete directly with other natural gas companies; but it does compete with electric utilities and with oil and coal. Regulation does not insure the natural gas utility against loss from this competition nor does it guarantee that earnings will remain at proper levels during times of depression. The common stock of a bankrupt natural gas utility can be just as worthless as the common stock of any other bankrupt.

I am not suggesting that wholesale bankruptcy for the industry is in the offing. On the contrary, the natural gas industry today is in the soundest financial position of its history and its present ability to raise new capital

has, in my opinion, never been exceeded by any industry. My plea is that *now is the time to improve regulatory procedures and laws so as to keep its financial condition sound.* This is especially necessary, because utility companies are not able to finance any substantial part of their growth from retained earnings but must do so through the sale of additional securities. A sound financial condition and proper earnings are necessary if the utility companies are to attract the required new capital.

Finally, let us consider the gas producer. When a fuel having operating advantages over competing fuels sells at a much lesser cost than those competing fuels, the reasons must be closely examined. To the extent that it is due to inherent advantages, and I am referring to its transportation and utilization advantages, the cost difference may be justified. However, when it is not due to these causes, that is another story. First, I believe the rates charged for natural gas should rise as certain of the regulatory commissions adopt a more equitable theory of rate making. Secondly, I believe that as a general premise the value of natural gas at the well should go higher so that it will sell more in relation to the field value of competing fuels.

NEEDLESS to say, producers are not a special class of people who are not affected by the decreasing value of the dollar. The cost of drilling, operating, and maintaining wells has increased and the dollars received by independent producers for their gas will buy no more than the dollars received by anyone else. This question of the decreasing purchasing power of our currency affects everyone. Recognition of that fact should not be confined to labor or any other class alone.

So it naturally follows that if natural gas field prices are increased and the earnings of the utilities are permitted to rise, then retail prices of natural gas must be increased. This would obviously lessen some of the present demand. From a long-range viewpoint, *it would be much better for the natural gas companies and the natural gas producers if these immediate demands were lessened.*

We already are finding it, however, impossible to keep demands under control. Wouldn't it be better to have a lessening in demand with a consequent improvement in the long-range picture of natural gas? Certainly that would be better than this present orgy of expansion in the use of one of our great national resources without due regard for its true economic value.

Also, it appears that field prices should rise to bring them into line with competitive fuel prices in the field. If this can be accomplished, it should be done over a period of time and any increase in field prices must be synchronized with increased retail prices. Since the latter requires action by regulatory commissions, it is bound to be a slow and gradual process.

THE recent order of the Petroleum Administration for Defense restricting service to new space-heating customers in some areas has focused attention on our immediate supply problem. I imagine that all of the distributors in the Appalachian area have had experiences somewhat similar to ours. Since the additional require-

ments for gas in the Appalachian area must be taken care of by bringing in gas from the Southwest, the requirements must be anticipated months and even years ahead.

From the standpoint of the transportation company, gas supplies and reserves must be secured, the approval of regulatory commissions must be obtained, and the additional facilities must be engineered, financed, and constructed. On the part of the Appalachian companies, gas storage facilities must be provided and additional facilities, both transmission and distribution, must be constructed.

UNLESS large additional supplies of gas are received, we cannot expect the situation to improve in the near future because, in spite of restrictions, demands will continue to increase. But while more pipe and plant expansion may be the material answers to our immediate problem, these will not be forthcoming indefinitely, unless attractive investment opportunities are also provided. This brings us right back to the basic question of this article—fixing rates which will be fair to the industry as well as the consuming public and employees.

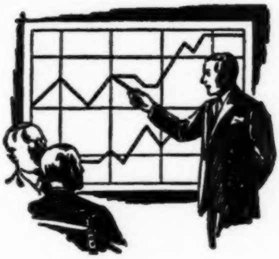
For the future well-being of our industry and its customers, additional load should come on in an orderly manner. Our big problem is to control the increasing demand for natural gas in the face of the considerable price differential which exists.

In a nonregulated industry the economic law of supply and demand would normally take care of such a situation. When the supply was not sufficient to meet the demand it would operate to control the demand by increasing prices. But that economic law does not apply to a regulated business.

In short, I believe that the price situation requires some adjustment. Retail gas prices should be increased in order to bring them more in line with competitive fuel prices. I am of the opinion that such an increase is justified because I believe utility earnings should be higher.

PROVED *recoverable reserves of natural gas in the United States on December 31, 1950, were estimated at 185.59 trillion cubic feet as compared with 180.38 trillion cubic feet a year earlier, an increase of 5.21 trillion cubic feet. Production of natural gas during 1950 was 6.89 trillion cubic feet and new discoveries and expansion of estimates of former reserves amounted to 12.11 trillion cubic feet. Despite the tremendous increase in use of natural gas for domestic and industrial fuel use, total production of natural gas during 1950 increased only 648 billion cubic feet, attesting to the big decrease in flaring of natural gas in the fields and to the efficacy of conservation methods being practiced by the natural gas industry.*

SOURCE: *American Gas Association.*



Rate and Financing Problems Of Gas Industry

What are the factors which must be considered in fixing a return sufficient to assure confidence in the financial integrity of gas utility enterprise, so as to maintain its credit and attract capital? The author has analyzed this exacting question, and has spelled out some interesting answers.

By WALTER J. HERRMAN*
VICE PRESIDENT, SOUTHERN CALIFORNIA GAS COMPANY

An accepted standard test among economists for earning comparisons is the rate of return on stockholders' equity. For example, the Federal Trade Commission and the Securities and Exchange Commission publish a regular quarterly report which shows the percentage rate of income related to the associated equity investment of United States manufacturing enterprises, both in total and by industry groups. The aggregate investment involved in these comparisons is about 130 billion, so it is a comprehensive and representative report. By way of illustration, the annual rate of return for the last quarter of 1950, for the all-companies group, was 16.4 per cent. For the auto group it was 16.8 per cent; for the petroleum group it was 18 per cent, etc. Of course, these percentages relate to total equity investment, including both preferred and common stock, so that the rate on the common stock only would naturally be higher. The majority of these companies have only a nominal debt, and it is, of course, axiomatic that where the debt is larger than average, the risk and the rate of return will be higher than average.

One basic reason for these high percentage rates in recent years is because today's income dollar has a lesser real value than the average investment dollar which was dedicated to the business when its purchasing power was generally much higher.

Another factor which has resulted in a high earning rate on investment is the use of depreciation based

*For additional personal note, see "Pages with the Editors."

on cost. Obviously, a company which assigns only $1 of depreciation as expense when it costs $3 to replace the worn-out facility is overstating earnings by $2. Without attempting to take sides on the issue as to whether such additional costs should or should not be reflected in depreciation expense, the facts of the matter are that as long as the accountants and the Internal Revenue Department elect to use original cost depreciation, management has no recourse but to provide the extra requirements out of so-called income. As Roland Bird, editor of the *London Economist,* put it: Present-day income reports should be certified to only with proper qualifications, which Mr. Bird suggested might read somewhat as follows:

> Subject to the capital market providing sufficient resources to make good the drain that has occurred through (a) "inflation," (b) "wrong price policy," (c) "the taxation of capital"—all of which are "made to masquerade as income"—subject to these qualifications, "such balance sheet and profit and loss account give a true and fair view.

LET us now turn to the Hope Natural Gas Company decision of 1944,[1] wherein the U. S. Supreme Court said that the measure of return for a gas company should be the return earned on *other comparable investments.* We have seen first that the accepted and proper comparison is the rate of earnings on investment, and we have seen also with respect to a broad cross-section of industrial investments that the rate of return in recent years has averaged 15 or 16 per cent as compared to 10 per cent or less prior to 1946. Finally, we know that this increase in the rate of return is to a large degree the result of changes in the purchasing power of the dollar, and that the effective return is actually much lower.

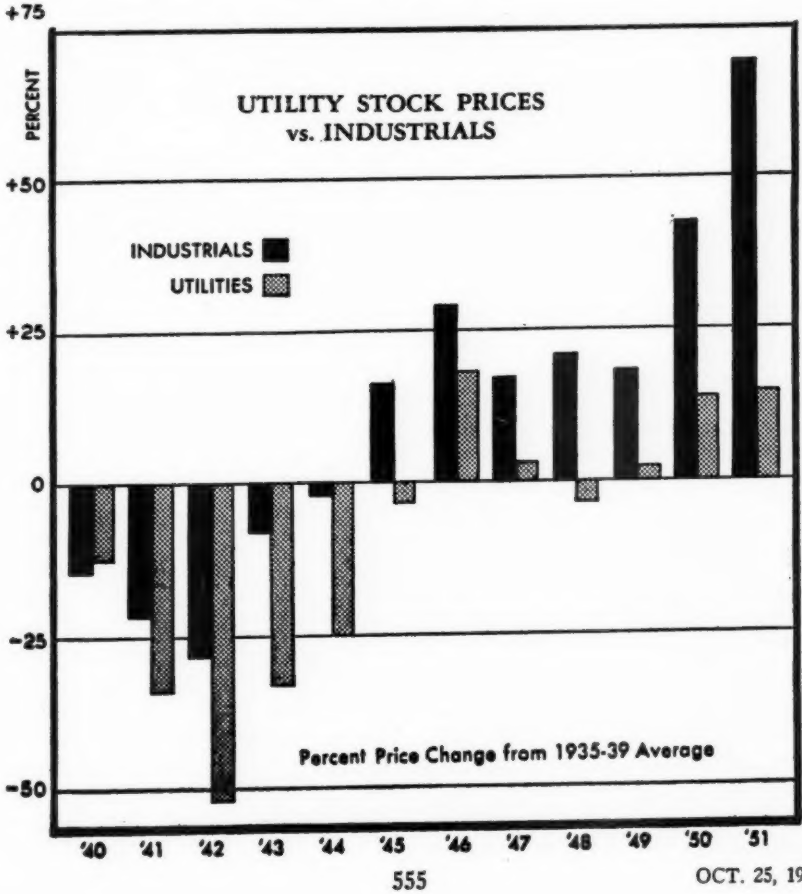
AS a general rule, it is not considered suitable to use the earnings of industrial companies as a criteria for utility earnings because industrial earnings tend to fluctuate rather widely, whereas utility earnings are inclined to be more stable. But this raises a pertinent question: What part of the high industrial earnings in the last five years was due to boom conditions, and what part was due to the change in the value of the dollar? Even when business was slow as in 1949, the earnings rate was still approximately 14 per cent, whereas in comparable slow periods prewar, such as 1938, the rate dropped to 5 per cent. At the other extreme — when business has been prosperous—as it was last year—the annual rate was 17.1 per cent, compared to only 11 per cent in a prosperous prewar year like 1937. These differentials, I submit, indicate a general lifting of the earning rate, and the fluctations of the business cycle are simply superimposed on this higher basic rate. Thus, while earnings of industrial companies cannot be used indiscriminately as a basis for utility earnings, we must still bear in mind this fundamental change in earnings rates which arises out of an imbedded inflation and which permeates our entire economy, *including the utilities.*

THE degree to which these changes in earning levels has been re-

[1] 51 PUR NS 193.

flected in the utility industry has not been uniform, because earnings of utilities, at least for the shorter term, are controlled by regulation rather than by natural economic forces, and because the concepts and methods of regulation vary from state to state and even within the same state. For example, the states of Ohio, Pennsylvania, Indiana, Michigan, Illinois, and Delaware generally recognize changes in property values, and utility earnings in those jurisdictions have tended to keep more nearly in line with earnings in other industries. In other states, like Texas, Iowa, Florida, and Mississippi, regulation is largely at the local community level, and in most cases the utilities in those states have faired reasonably well.

In Louisiana and Missouri, there has been special treatment of the depreciation accounts, which has been helpful even though on a limited scale.



It is interesting to note, in this connection, that informed investors, such as the investment trusts, are well aware of these regulatory distinctions and their purchases of utility common stocks are influenced accordingly. As a result, commissions in some other states, where regulation is nominally on a cost basis, have nevertheless recognized the practical aspects involved by increases in the rate of return, or by other modifications in the more rigid formulæ heretofore employed. H. M. Miller, formerly president of the NARUC and one-time chairman of the Ohio Public Utilities Commission, summed the situation up in a talk to the New York Society of Security Analysts in November, 1949, when he said:

> I believe there is widespread recognition among the state commissions of the need for application of sound economics in the solution of utility problems.
>
> It is true that there have been some contrary trends in the last twenty years. I believe, however, they have run their course; at least I think I see evidence to that effect in many quarters . . . in the long run, in a capitalistic system, or elsewhere, the consumer is served best if his utility is treated fairly.
>
> The application of sound economic principles is particularly important in a period of violent change, such as that which we are now witnessing. Rules of thumb which do rough justice during long periods of stability have no place in a period characterized by rapid changes in volume, in nature of the load, in operating ratios, and in plant expansion.

AIDED by a more liberal and practical attitude on the part of the commissions and by its own constant search for more efficient methods, the average utility has done an excellent job of keeping rates low and earnings reasonable at the same time. It is not necessary for me to compare utility rates with other items that make up the cost of living—we all know that the increase in the price of our product has been practically nil in a world where almost all other costs have doubled.

What may surprise some of us is that, in spite of our low prices, many companies have nevertheless been able to report earnings of 10, 12, and 14 per cent and higher on their stockholders' equity. One reason for this is that a relatively small rate increase may have a greatly magnified impact on return, although this beneficial effect is being reduced as income taxes are increased. For example, in an average utility with a plant-revenue ratio of 4 to 1 and an operating ratio of 80 per cent, a rate increase of 10 per cent would increase the rate of return 50 per cent before income taxes and 25 per cent after income taxes. Another factor in our favor is the high value of our service to our customers in relation to price—so that we are able to increase the price without noticeably affecting the demand.

TAKING all of these considerations together, in determining the rates and total return requirements for a specific company, the objective should be to bring the earning rate up to a level in line with that of more prosperous sister companies. A minimum level, in my opinion, would be the average earning rate of a large group of companies, such as those reported by *Gas Facts* or by the Federal

Relative Earnings—Utilities and Industrials

"As of mid-1951, the industrials stand 70 per cent above prewar, the utilities only about 13 per cent, and this is in spite of the relatively good earning showing by many individual companies. While the performance of industrial shares should not be taken as an unqualified standard for the utilities, these price trends should be much more closely in gear if we are to maintain the investor confidence needed to sell our securities in the large amounts that will be required over the next several years."

Power Commission. Even these larger groups, which naturally include some companies where the return is inadequate, are averaging approximately 12 per cent on their common stock equity (principally natural gas distribution companies).

Obviously, unless the earnings available for stockholders are on a parity with such averages, the particular company does not meet the criterion of the Hope Case, and, as time goes on, its credit status and its ability to attract new capital on favorable terms in competition with other companies will be impaired.

THIS brings me to the collateral problem of financing. So far most Pacific coast companies have been able to obtain new capital without too much difficulty, although a number of issues have not moved as promptly as the security dealers would have liked.

From my contacts with the investment business, I know that one very important characteristic which has always been sought after in a stock is growth of earnings, and this has become doubly important in light of today's severe inflation when maintenance of purchasing power is a primary consideration. If the growth prospects are not good, investors tend to reduce their appraisal of a stock in relation to earnings.[3] For example, if Company A has a record of increasing its earnings say 10 per cent annually, whereas Company B has a record of stable earnings, the market may pay perhaps $15 for each dollar of current earnings of Company A as compared

[3] This is borne out in Moody's "Stock Survey," August 6, 1951, comparing market yields of "growth" stocks with "income stocks."

with say $10 for each dollar of current earnings of Company B.

Thus, investors may be willing to pay almost twice as much for a given present income from stocks whose earnings are growing as for the same income from stocks whose earnings are stable. Lack of earning growth can readily result in higher capital costs to a utility, with a consequent need for higher rates.

From the investors' point of view, *stability of earnings actually means slipping backward*, as dividend dollars lose their value in terms of purchasing power. This is especially true in light of our Federal tax policy, which taxes current income at maximum rates, whereas the tax on capital gains is presently limited to 25 per cent. It is necessary, therefore, before we can say whether our financing has been fully successful, to determine at what prices we have been able to sell our securities in relation to the market for other issues, taking into consideration prices over a period of years.

A simple pragmatic test is the market record itself.

THE chart on page 555 shows the comparative record of utility and industrial stock prices related to 1935-39 average quotations as published by Standard & Poor's. In 1940, and for several years after, security markets were depressed owing to the war and to controls and high taxes. Observe, however, that utilities, which we consider to be a stable type of investment, declined substantially more than the industrials, so that in 1942 they had lost more than 50 per cent of their 1935-39 average price, whereas the average industrial declined only a little more than 25 per cent.

Note, also, that when prices began to come back—the industrials recovered their loss by 1944, whereas the utilities still lagged by 25 per cent. Then, as we entered the postwar period, the gain in industrials was about 30 per cent, but the utilities did only about half as well, and, at the first turn in the market, even this minor improvement was lost again. The big differential has come with the price inflation since 1949.

As of mid-1951, the industrials stand 70 per cent above prewar, the utilities only about 13 per cent, and this is in spite of the relatively good earning showing by many individual companies. While the performance of industrial shares should not be taken as an unqualified standard for the utilities, these price trends should be much more closely in gear if we are to maintain the investor confidence needed to sell our securities in the large amounts that will be required over the next several years. A study which I made recently of 40 large eastern gas and electric utilities showed that 34 had increased their dividends since 1946, and that the average increase was approximately 45 per cent.[8] This study carried me to the end of 1950, and I saw recently from a New York Stock Exchange release that additional dividend increases averaging 13 per cent had been made in the first six months of 1951.

MY last point in connection with financing relates to sources of

[8] Companies with gross revenue over $10,000,000 whose common stock was outstanding in hands of public for period 1946-50.

funds. On the average, gas companies have depended pretty largely over a period of years on depreciation cash and bonds as primary sources of new money, but in the last year or two, they have also gone to the market for some new common stock money. My guess is that, from here on out, they will all be more dependent on common stock funds, first because the total volume of new money requirements is so large in relation to depreciation cash, and secondly because many of us have about used up most of the margin that we consider safe for the issuance of senior securities.

Our problems in this connection are very much greater than those of other businesses because our utility status forces us to expand whenever our customers demand service, regardless of the economic consequences, and also because the amount of our investment is so much larger in relation to revenues than in other lines of business.

Consider how manufacturing companies obtained their capital for new plant in 1951. According to *Business Week* (issue of March 29, 1951), 86 per cent of the requirements come from depreciation and retained earnings and involve no outside financing. Another 11 per cent is obtained from the sale of bonds and from senior securities. Only 1 per cent comes from the sale of new capital stock.

LOOK now at the record for Southern California Gas Company for the years 1938-46, inclusive. It is substantially ***the same as for the manufacturing companies in 1951.*** The same amount—86 per cent—of our total requirements came from internal sources. Fourteen per cent came from the sale of bonds, resulting in an increase in the debt ratio from 33 per cent to 35 per cent over the period.

Next, consider the same California utility during the next four and a half years—1947 to date. One result is that internal funds—although totaling about the same in dollars—provided only about 27 per cent of our new money requirements. Bonds provided about 42 per cent, bringing the debt ratio from 35 per cent to 47 per cent. The balance, about 31 per cent, had to be obtained by the sale of common stock, which more than doubled the amount outstanding just four years ago. Previously, the bulk of our needs was generated from within—today the situation is just reversed and we must get most of our new money from outside investors.

Compare this situation again with the industrial group — where new stock sales are only 1 per cent—and you will see why it is especially important for the utilities to make a good earning showing if they are to attract this large amount of equity

"... one very important characteristic which has always been sought after in a stock is growth of earnings, and this has become doubly important in light of today's severe inflation when maintenance of purchasing power is a primary consideration. If the growth prospects are not good, investors tend to reduce their appraisal of a stock in relation to earnings."

capital to the industry. Nor is it safe, in my opinion, to assume that our past success in obtaining new capital will necessarily carry over into the future, because the amounts involved are so much larger and the relationships between the various classes of capital sources are changing so radically. (AGA has estimated new capital requirements for the gas industry for 1951-55 at $4,590,000,000.)

LAST, but not least, it is of course apparent that as larger percentages of our new capital come from the sale of stock, the cost of this money will increase sharply. Assuming new stock capital costs say 10 per cent (please do not confuse this with the higher return requirements on presently outstanding capital dedicated to the enterprise in earlier years) this is approximately three times the cost of new debt capital, and the ratio is magnified in turn by income tax rates which make it necessary to collect $2 in revenues to obtain $1 of net income. Meanwhile, the cost of bond money itself, which declined generally through 1950, has recently increased by approximately 20 per cent to 25 per cent.

IN conclusion, I wish to emphasize that the impact of continued inflation is bringing us new and unique problems in rates and financing, which in my opinion will make it necessary for us to modify our former concepts of return requirements. I am reasonably confident, for example, that utilities as a class cannot maintain their financial integrity and continue to attract capital with earnings rates substantially less than those of industry in general. I am concerned over the acceptance of depreciation calculated on cost, while year-to-year replacements are being made at perhaps three times cost and the difference is absorbed by selling new securities which add nothing to plant or to revenues. There used to be a time when a business was something which we put money into with the expectation of getting out more than we put in. Today, in the utility business, we seem to be continuously putting in *more* and *more* money with the net withdrawals a *large negative quantity.*

"TODAY'S *finely prepared coals—used in a modern electric generating plant—produce almost seven times as much energy per ton as coal burned fifty years ago.*

"In 1900 it required an average of approximately seven pounds of coal to make a kilowatt hour of electric power. Today, more than 100,000,000 tons of coal are used annually in making electric power. If it still required seven pounds of coal to make a kilowatt hour of power, it would require more than 500,000,000 tons of coal annually to do the work that better coal and more modern burning facilities provide our country today."

—EXCERPT *from broadcast by the Bituminous Coal Institute.*

Natural Gas As a Chemical Raw Material

The doctrinaire Liberals of the 1930's advocated a "planned" or restricted economy on grounds that America's industrial frontiers were exhausted. They reckoned without the industrial resourcefulness which has made the chemical by-products of natural gas—taking a single example—as important as the original basis for development.

By GERARD M. IVES*
VICE PRESIDENT, GUARANTY TRUST COMPANY OF NEW YORK

This is a story about natural resourcefulness with natural resources. It is a panoramic look at an ultramodern industry which is growing fast in the Gulf South[1] in the manufacture of petrochemicals from natural gas and petroleum. It is a technological phenomenon of our time which indicates new and better things for our American mode of living.

Being a banker, the writer does not profess to technical knowledge of chemistry and reliance is therefore placed on my New York bank's sources of information relating to this notable industrial trend. Because my banking function is primarily concerned with the electric and gas utilities, I naturally follow with a layman's interest this timely chemical development involving natural gas.

The inception was in the 1920's, although the real significance of petrochemicals did not become evident until the onset of World War II, and in the past six years their growth has been remarkable, notably in the Texas-Louisiana Gulf region. Some twenty-five years ago scientists of Cities Service Oil Company were searching for ways to stop pipeline corrosion. Gas was passed over a catalyst in a heated tube, and the company found itself in the chemicals business because formaldehyde and other oxygenated chemicals were produced

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* For additional personal note, see "Pages with the Editors."

[1] The descriptive term used by the United Gas Pipe Line Company to delineate the area which it serves.

in the reaction. In that time alcohols and certain crude organic chemicals were being made from petroleum, but the great chemical potentialities—as distinct from liquid fuels and lubricants—were to be explored.

REFINING technology was making real advances in techniques for breaking down, building up, rearranging, and revising the phenomenal hydrocarbon molecules which constitute natural gas and oil. In a real sense, the economic depression of the 1930's was the period of gestation of our newly important petrochemicals industry. Research laboratories were hard at work in their chemical explorations.

A revolution in textiles was being fashioned. Synthetic rubbers were coming up. Plastics uses were expanding. Welded, seamless steel pipe was opening up new vistas for marketing natural gas to consumers in the North and East. Atomic energy was in germination.

Union Carbide & Carbon Corporation pioneered with new processes involving high-pressure synthesis from natural gas when its researchers got busy with refinery gases. From ethylene and propylene in particular this company developed a whole range of synthetic organic chemicals. Thereafter, the technological race was on. Meanwhile, in 1936, Standard Oil Company of New Jersey began making the petrochemical, ethyl chloride, at Baton Rouge.

World War II created the big opportunity. Aviation gasoline had to be produced in great volume. A new synthetic rubbers industry was built in haste and based upon butadiene. Explosives in enormous volume were vital and toluene for TNT began to come out of oil. The historic trend began in the Gulf South where petroleum and natural gas abound, along with sulphur, lime, salt, and other economic inducements. In 1941 Union Carbide & Carbon Corporation, which deserves such high praise for its pioneering, located a plant at Texas City adjacent to the Pan-American refinery.

Subsequent settlements include such great names as Du Pont, Monsanto, American Cyanamid, Dow, and Celanese, along with the established oil refiners whose trending into chemicals has been equally impressive. Originally attracted to the Gulf for producing magnesium from sea water, Dow Chemical Company expanded its activities into petrochemicals. Du Pont located there for making nylon salt, methanol, and polyethylene. Shell Chemical Corporation, near Houston, uses by-product gases from the adjacent Shell refinery to make an astounding list of petrochemicals which include such common items as glycerine, rubbing alcohol, and ethyl or "grain" alcohol. These mentions are merely high spots.

THE technology of petrochemicals from crude oil, refinery gases, and natural gas is ramified and interrelated. Our primary concern here is the use of *natural gas* as a chemical raw material. Carbon black and sulphur extraction processes are outside of this scope, and synthetic rubbers are given only passing mention because of space limitations.

For our purpose here, what is natural gas? It is considered to be the

light gaseous hydrocarbon molecules of methane (1 carbon), ethane (2 carbons), propane (3 carbons), and butane (4 carbons). Liquid gasoline consists generally of hexane (6 carbons) through decane (10 carbons).

At the wellhead, natural gas is a variable mixture. It is predominantly methane, with varying proportions of ethane, propane, butane, natural gasoline, and impurities such as nitrogen, carbon dioxide, and occasionally hydrogen sulphide and mercaptans. The natural gasoline is extracted. Propane and butane are recovered for their expanding commercial fuel markets, but they have important chemical usefulness as well. In itself, ethane is not so important, but the fact that it is convertible into ethylene has great chemical significance.

Acetylene, ethylene, propylene, and butylene are gases which derive either from oil or gas. They are *unsaturated,* which in layman's language signifies that the molecule is highly reactive and eager for chemical union. In fact, the layman would describe ethylene as the ethane molecule with two hydrogen atoms knocked out of it in the cracking process.

CELANESE CORPORATION OF AMERICA achieved notable success for its method using propane and butane for making chemicals needed for its acetate rayons, plastics, and other products. Its plant at Bishop, Texas, is to be supplemented by a new one to be at Pampa, in the Panhandle of Texas. It reacts those hydrocarbons with oxygen from air to produce a wide range of chemicals, a major one being acetaldehyde, which in turn is converted into acetic acid. Other chemical reactions also produce formaldehyde, methyl alcohol, normal propyl alcohol, butyl alcohols, propylene glycol, and solvent mixtures.

Methyl alcohol and formaldehyde both have an expanding commercial importance and are produced in the same facilities. Most methyl alcohol today is manufactured from natural gas, instead of coke oven gas and wood distillation as formerly. Formaldehyde has bulk markets for plastics and other uses. Butadiene for synthetic rubbers starts out in some cases from the butane in natural gas.

Acrylonitrile is a portentous name because of its basic significance to orlon and the other man-created textile fibers which are expected to replace wool for many purposes. Acrylonitrile comes presently from ethylene oxide and hydrogen cyanide, but will come as well from acetylene and hydrogen cyanide as derivatives of natural gas. Jefferson Chemical Com-

¶ "NATURAL *gas is a relatively clean, laborless, and chemically familiar raw material for processing by continuous-flow methods. It exists in a fundamental abundance which enables long-term planning, justifying heavy capital investments. For long-term contracts to pipelines it is today worth about ten cents per thousand cubic feet, which is well above its worth a few years ago."*

pany produces ethylene oxide. American Cyanamid and Union Carbide now make acrylonitrile. The new Chemstrand plant at Decatur, Alabama, will use acrylonitrile made at Texas City for its new acrylic textile fiber and chemicals for plastics and synthetic rubber. Chemstrand fiber is made by Chemstrand, Inc., a company jointly owned by Monsanto and American Viscose Company, and it is very significant that Monsanto Chemical Company will make the acrylonitrile out of natural gas.

THE importance of acetylene is familiar for welding metals, but consider its chemical potentialities. It is a basic "building block" in the elaborate masonry of synthetic organic chemistry. Union Carbide & Carbon Corporation has its new process which involves a high temperature reaction of methane and oxygen. This process requires appreciably less power than any known electric process for making acetylene, and the company's plant at Texas City is due for expansion. The company uses acetylene in the manufacture of vinylite resins, which are important plastics. Its process will be confined to large-scale installations in areas having large natural gas reserves, and to locations where the acetylene gas can be used directly in manufacturing. Chemical Construction Corp., an affiliate of American Cyanamid Company, has North American rights to the Badische Anilin & Soda-Fabrik process for plants to produce acetylene from natural gas.

One of acetylene's potentialities may be for producing benzene, although the economic feasibility of this is questioned. Benzene is a basic aromatic "ring" molecule of great significance to a broad and colorful range of synthetics that include explosives, dyestuffs, solvents, biocides, medicinals, pharmaceuticals, and so on. The aromatic ring-shaped hydrocarbons figure in a picturesque legion of end products characterized by color, aroma, and taste. A few among them are perfumes, artificial flavors, food colors, dyestuffs, and medicinals as aspirin and barbiturates. There is presently a world-wide shortage of benzene, which has come predominantly as a by-product of the coking of coal, and the apparency today is that coking sources are inadequate for satisfying our consuming needs. The trend of petrochemicals from oil refining into the very important aromatics is most significant.

Pan American Refining Company, Humble Oil & Refining Company, and Shell Chemical Corporation are petrochemicals producers already in the field of aromatics. It is impressive that the Koppers Company, an eminent name in coal tar, is joining the petrochemicals trend by projecting a new plant on the Texas Gulf.

A CYNOSURE of watchful interest today is the venture of Carthage Hydrocol, Inc., at Brownsville, Texas, which is now in operation. What its commercial success, or lack of it, may be in synthetic fuels is outside of the scope of this article. Built at great risk and courage, it is an outpost of a new frontier. Our attention here is on the plant's production in bulk of chemicals generally classified as alcohols, ketones, aldehydes, and organic acids which will be processed in the contiguous plant of Stanolind Oil &

Dynamic Growth of Petroleum Chemicals

"PETROLEUM *and natural gas are as* VERSATILE *as they are vital to the economy of our industrial civilization as we know it in America today. The rapid growth and potentialities of petrochemicals are a great tribute to the farsighted devotion to scientific research evidenced by the progressive spirit and outlook of our American oil and chemical industries."*

Gas Company. Ethyl alcohol and acetic acid are principal ones.

Carthage Hydrocol, Inc., applies the so-called Fischer-Tropsch technique, although the American adaptation is so much improved over the German that it deserves its American name—the Hydrocol process. Natural gas and oxygen from air are reacted to provide "synthesis gas," a mixture of carbon monoxide and hydrogen. By catalytic procedure this is transformed into synthetic fuels plus organic chemicals mixtures, but the emphasis here is that the process is versatile and flexible. It can be manipulated to produce other things, especially ammonia, from the synthesis of the residual gas. Ammonia is the common carrier of nitrogen.

(A possibility in the research stage is the usage of "synthesis gas" in the reduction of iron ore to iron. If feasible, this might be attractive in iron ore areas having natural gas but no coking coal.)

SYNTHETIC ammonia from natural gas has become so important that today well over 40 per cent of the national production comes from this source. From ammonia it is simple to make nitric acid, which is basic to explosives and of great commercial value as a crude chemical for other uses. Soil fertilizers represent bulk markets as ammonium nitrate and ammonium sulphate. Thus plant food chemicals, biocides, and such, are an expanding field for petrochemicals. Mathieson Chemical Corporation was in the forefront in making ammonia from natural gas. Of the oil companies, Lion Oil Company, at El Dorado, Arkansas, figures importantly. Spencer Chemical Company at Pittsburg, Kansas, and elsewhere, produces nitrogenous products, methyl alcohol, and dry ice, which derive from natural gas, steam, and air as raw materials. It has recently put in operation a new ammonium nitrate plant, and plans a new anhydrous am-

monia plant at Vicksburg, Mississippi. Other makers of nitrogenous products include Commercial Solvents Company, Phillips Chemical Company, and Mississippi Agricultural Chemical Company.

Ammonia from natural gas has enlarging agricultural and industrial uses. Small grains, sugar cane, and produce growers are increasing their needs for fertilizer. The airplane is being applied increasingly for spreading fertilizer over fields. The new method is significant wherein irrigation water is used to carry in solution the enriching chemicals and spread them over the crops.

New chemical textiles are more or less children of natural gas, among which are orlon, dynel, dacron, chemstrand, etc. Ethylene glycol is the natural gas element in dacron. Rohm & Haas and Du Pont currently make hydrogen cyanide from natural gas and ammonia, with others coming in. This, with acetylene, produces the acrylonitrile which figures so prominently. In fact, it is being prophesied that synthetics will do to wool what nylon did to silk.

ANOTHER focus of attention centers on Mathieson Hydrocarbon Chemical, a new company organized by Mathieson Chemical Corporation and stockholders of Tennessee Gas Transmission Company. The latter's natural gas pipeline will be tapped at a point in Kentucky for withdrawing heavier hydrocarbon components from the gas stream flowing eastward to market.

Let us assume that fuel gas flowing through a pipeline to market is perhaps 95 per cent methane, with maybe 2 or 3 per cent ethane and heavier components, and a small impurity of nitrogen. Consider the ethane alone. That ethane can be subjected to high temperature cracking to produce ethylene, which is very important for making ethylene glycol (antifreeze), ethylene oxide, polyglycols, ethylene dichloride, and polyethylene. Derived products are useful for cellophane, synthetic detergents, synthetic fibers, plastics, hydraulic fluid, and so on. Ethylene oxide is basic to acrylonitrile, with all that means to new synthetic textiles, detergents, and certain synthetic rubbers.

Adjoining the Mathieson plant in Kentucky will be a new manufactory of General Aniline & Film Corporation which may be ready by 1953. The Mathieson plant will supply the raw materials to General Aniline & Film Corporation for manufacturing into chemical products, with detergents and wetting agents figuring importantly.

Apparently a petrochemicals plant may locate, where economically feasible, along a natural gas pipeline anywhere. In point is the recent announcement that National Distillers Products Corporation and Panhandle Eastern Pipe Line Company have formed the National Petro-Chemicals Corporation for operation in the Champaign-Urbana area of Illinois where Panhandle's natural gas pipeline system joins the Trunkline Gas Supply Company. Ethane, propane, butane, and other hydrocarbons will be withdrawn from the natural gas, with chemical derivatives of ethane receiving initial emphasis. It is expected that the extraction plant will be completed by the autumn of 1952 and

the chemicals manufacturing plant, notably for ethyl alcohol and ethyl chloride, by midyear 1953.

OTHERS in petrochemicals from natural gas include Cities Service Oil Company, whose plant at Tallant, Oklahoma, is a veteran producer. Tennessee Eastman Corporation is in the picture with a new plant at Longview, Texas. Ethyl-Dow Company is another.

However great as a technological trend, it looks today as if petrochemicals will be only a minor consumer of natural gas, as measured against the enormous consumption of fuel gas. A million cubic feet weigh about 21 tons. A rough rule of thumb is that in the common petrochemicals the gas used is about half the weight of the finished product. By this reckoning, 1,000,000 cubic feet of natural gas will make 42 tons of a product, and 42 tons is a lot of petrochemicals. If methyl alcohol is taken as an example, the total output of synthetic methyl alcohol is about 664,000,000 pounds per year. If *all* of this were derived from natural gas, only 22,000,000 cubic feet per day of gas would be consumed. Some individual industrial consumers use 100,000,000 cubic feet daily.

Natural gas is a relatively clean, laborless, and chemically familiar raw material for processing by continuous-flow methods. It exists in a fundamental abundance which enables long-term planning, justifying heavy capital investments. For long-term contracts to pipelines it is today worth about ten cents per thousand cubic feet, which is well above its worth a few years ago. Most of the known natural gas reserves are committed to fuel gas markets, and usage for petrochemicals is only a relative trickle.

THAT is the general picture in midyear 1951, as it looks to a New York banker. Industrial trends are of the greatest importance to a bank and it is the trend which is of such interest here. It is a task to try, as herein, to confine the discussion to natural gas, as distinguished from petroleum and refinery gases. Specific mentions were not made for purposes of invidious comparisons, for the great names of oil and chemicals are in this astonishing petrochemicals development. About seven-eighths of the capacity is located in the Gulf South; yet it is only fair to say that petrochemicals are manufactured on the West coast and in the East and Canada, as well. Oronite Chemical Company, a subsidiary of Standard Oil Company of California, figures importantly in the West.

¶ "IN *a real sense, the economic depression of the 1930's was the period of gestation of our newly important petrochemicals industry. Research laboratories were hard at work in their chemical explorations. A revolution in textiles was being fashioned. Synthetic rubbers were coming up. Plastics uses were expanding. Welded seamless steel pipe was opening up new vistas for marketing natural gas to consumers in the North and East.*"

Among prominent names are Esso Standard, Standard Oil Company (Indiana), Phillips Petroleum Company, Socony-Vacuum Oil Company, Cities Service Oil Company, Texas Company, Shell Oil, Sun Oil, Continental Oil Company, Lion Oil Company, Sinclair, Ethyl Corporation, Atlantic Refining Company, Gulf Oil Corporation, Humble Oil & Refining Company, Pan American Refining Company, and so on. The rubber manufacturers obviously rely on petroleum sources for their synthetic rubbers. Recently the formation of American Petrochemical Corporation was announced by Cities Service Company and Firestone Tire & Rubber Company for the manufacture of chemicals from petroleum hydrocarbons.

Quantitative and expanding markets are apparent today in the new textile fibers, detergents, fertilizers, plastics, and synthetic rubbers. The petrochemicals trend of oil refining to watch today is into the colorful aromatic synthetic organic chemicals which have long depended on the coking of bituminous coal. Coal tar should continue to serve importantly; the point is that America's consuming needs are expanding so rapidly that the supply of coal tar appears to be inadequate.

PETROLEUM and natural gas are as *versatile* as they are vital to the economy of our industrial civilization as we know it in America today. The rapid growth and potentialities of petrochemicals are a great tribute to the farsighted devotion to scientific research evidenced by the progressive spirit and outlook of our American oil and chemical industries.

Let us recall the doctrinaire talk of political "Liberals" of the depressed 1930's when they advocated the "planned economy" on grounds that these United States had no "new industrial frontiers." They might have realized that the beckoning new frontiers were in applied science which has brought us clothing, plant foods, explosives, and so on, having their genesis in natural gas. Truly the great inventions of our time have been developed in profit-motivated capitalistic America.

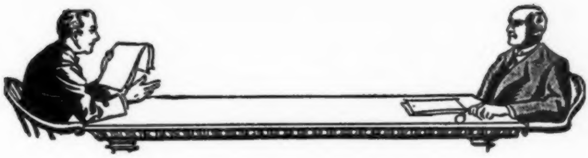
Steel Mills Help Gas Firms Grow

"STEEL *mills of Pittsburgh are stalwart helpers for the gas industry in its attempt to meet soaring fuel demands of factories and homes.*

"The nation's pipe producers by 1950 had supplied 175,000 miles of gas pipelines—enough to encircle the world 15 times. For the gas and oil industries combined, pipelines amounted to 533,000 miles—sufficient to girdle the globe 21 times, and weighing 60,000,000 tons. In 1950, pipe plants shipped over 2,425,000 tons or 16,100 miles of pipe lines.

"Total capacity in the nation for all pipe and tubular goods is 12,000,000 tons annually, an increase of 43 per cent in six years."

—W. L. RUSSELL,
Press business editor,
Pittsburgh Press.



The Safety Regulation of High-pressure Pipelines

Conflict between national and local regulation has appeared in the field of safety control for high-pressure gas pipelines. Bills before Congress and the state legislatures point up the need of a practical and co-ordinated approach.

By COLEMAN FARRELL*

"Pipeline Dangers Stir Wide Concern"

"Citizens Petition Legislature for Pipeline Safety Measures"

"Regulation Inadequate and Haphazard, Study Shows"

THESE headlines, picked at random from current newspapers, point up one indisputable fact that is paramount in the natural gas pipeline safety issue. There are no adequate *official* safeguards against hazards of new high-pressure interstate natural gas pipelines now authorized and being built in this country. The emphasis is on the word *official,* because it is the crux of the argument. The question is how official can you get when it comes to pipeline safety? And who should get official?

The subject has become a hot one in New England, where two high-pressure lines are now being built. Local concern about safety, and the collateral issue of real estate values and pipeline rights of way, has been felt in the halls of Congress. Representative John W. Heselton, Republican of Massachusetts, has introduced a bill calling for amendment of the Natural Gas Act to provide for Federal authority to prescribe safety requirements.

Two of the government agencies, the Department of Commerce and the Federal Power Commission, have reported to the House Interstate and Foreign Commerce Committee that such a measure would be in the public interest. But both were vague as to how to go about enforcement, and neither wanted the job of policing the pipeline industry on construction methods and maintenance. The bill (HR 88) is languishing in committee.

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THE only Federal safeguard now in force is that required by the Rivers and Harbors Act of 1899, which states that anyone building a structure of any kind in a navigable stream must file plans and obtain a permit from the Secretary of the Army, under pain of fine and imprisonment. In the past, the Army has accepted standard practices commonly used in the pipeline industry for river crossings. These requirements have never been written into law. In fact, they have been modified in accordance with technological advancements in the industry.

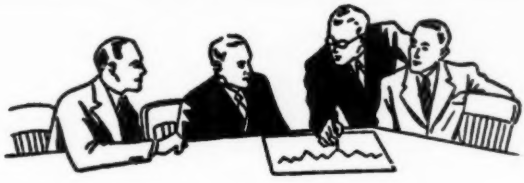
At the state, county, and local level, few safety regulations are in force. Some of these are concerned only with the less dangerous, low-pressure distributing lines of gas utilities in municipalities and built-up areas. When it comes to the construction and operation of high-pressure interstate lines, there is some doubt in the minds of many state public utility commissioners as to their jurisdiction at all. Where the authority seems clear, adequate *official* safety codes are seldom in effect, and various operating and inspecting problems beset proper enforcement.

The number of pipeline breaks or failures every year is a matter of record. Most authorities estimate that between 100 and 200 breaks occur annually in the 275,000 miles of natural gas mains in the United States. Most of them occur in rural areas, and result in few casualties.

The causes of pipeline failure are varied. Some breaks occurred while the lines were being tested for tightness by the constructors. Some were caused by welding failures or obsolete pipe-laying techniques. Some were the result of corrosion, of laminations in the pipe wall, of gouges caused by vehicles, or by the application of unexpected weight and vibration. Others were caused by freak accidents. The most notable break last year happened when a Delaware river vessel, in a 10,000-to-1 shot, drifted off course in a fog and dropped anchor directly on a gas pipeline buried in the river mud. No one was hurt, but the main line between Philadelphia and Atlantic City was out of service several days.

ANALYSIS of the causes of failure in the lines reveals two important facts. First, many failures are apparently due to circumstances beyond the power of any safety authority to prevent. Second, many failures occur in older, war-built lines, which were not designed with the necessary protective arrangements being incorporated into today's pipelines. It can also be argued that failure of a line under test is in itself a precautionary measure, since a test is run at one-and-one-half times the maximum operating pressure to which the line will be subjected in service.

A pipeline engineer explains the pattern of pipeline failures this way: Welding failures occasionally cause line breaks. But, contrary to public opinion, they are not a major cause of explosions. More frequently they cause leaks, which can be spotted by maintenance inspectors and corrected before they become serious. Corrosion is a problem in older lines, because it takes time for rust to eat through a half-inch wall of pipe, and because adequate anticorrosive protection may not have been built into



National Safety Standards for Pipelines

"It has been argued that scattered and nonuniform regulation of parts of high-pressure natural gas pipelines cannot be effective. This has been the position of those favoring the imposition of national safety regulations on the pipeline industry. A more realistic viewpoint is that a gas pipeline is a most complicated machine, which necessitates a thousand solutions to a thousand different problems of construction and operation."

earlier lines. Laminations, tiny flaws in the pipe wall, cause some line breaks and are the despair of pipeliners, since they cannot be detected except by X-raying the entire pipe, at prohibitive cost. But they occur so infrequently that X-raying is unjustifiable.

Out of a welter of opinion, sometimes conflicting, on the subject, it is fair to conclude that everyone thinks that pipe-making and pipelaying techniques have greatly improved, especially since the war, so that today's lines are inherently safer than earlier ones. Where older lines have shown weaknesses, it is agreed that the companies involved have gone to extremes to add safety factors wherever possible. And, as far as New England's fearful citizens are concerned, there is evidence that the new lines will be constructed with more precautions and safeguards than could be required by any regulating authority empowered by law.

For its own part, the gas industry relies upon the self-policing practices it has endorsed in other fields of gas utilization. Sound safety practices at the wellhead and in the gathering fields are in keeping with the American Petroleum Institute Code, which is voluntary, but which outlines the minimum precautions which must be taken under field conditions. At the burner tip, at the other end of the line, customer safety is assured through the Laboratories Approval plan of the American Gas Association, which carefully inspects thousands of models of gas appliances yearly. In between the well and the burner, the industry uses as its starting point the provisions of the newly stiffened Code for Pressure Piping, sponsored by the American Society of Mechanical Engineers and approved by the American Standards Association.

The Pressure Piping Code (known as ASA Code B31) became an American standard in 1942. It has been

amended twice since, and an extensive revision was issued in May of this year. Its proponents in the gas business believe it should serve to establish minimum construction and operating requirements, and aid the industry's self-regulation principles by obviating the need for outside regulation. If the authorities still wish to regulate, the code can serve as a workable guide for adoption or enactment of safety laws.

When the first edition of the code was approved, the largest heavy-duty, cross-country gas pipelines were 20 to 24 inches in diameter, and were operated at pressures no higher than 900 pounds per square inch. Since then, the construction of 34,000 miles of transmission lines has been authorized by the Federal Power Commission. Some of these lines have diameters of 30 to 34 inches, and are designed to operate at about the same pressures.

Improvement in materials has made it possible to increase the unit working stresses in pipe walls, so that diameters may be expanded and the same thickness maintained without reducing the pressure. This has resulted in sizable savings in steel (as much as 100,000 tons in a thousand miles of line) and in a more efficient pipeline operation, making gas transportation for longer distances feasible.

THE B31 Code already has played an important rôle in the extension of gas to large population centers. In 1949, Michigan orchard owners protested the installation of a gas pipeline through their properties, claiming it would be unsafe. The state public service commission investigated with the assistance of University of Michigan engineering faculty members. The pipe was put through severe tests, and it was proved that pipe manufactured and built to the code specifications was quite safe. The Michigan commission, along with several others, now requires that lines built in the state conform to the code requirement.

The Federal Power Commission contends that the code has its shortcomings; that it does not provide proper standards for modern high-pressure lines; and is not binding on anyone. Gas men reply that nobody claims the code is a performance standard, but merely sets forth minimums, beyond which pipeline builders and operators will inevitably go if they expect to get top-grade performance out of the lines. They maintain that pipeline breaks constitute far greater economic hazards, to the utilities and their customers, than hazards to public safety.

In actual practice, pipeline designers may exceed these ASA code minimums thousands of times in a single line, or the entire line may be built to more rigid specifications. H. D. Hancock, president of Gas Advisers, Inc., and the AGA's representative on the code committee, has pointed this out often in discussing the code. "It is the duty of the designing engineers," he states, "representing the users of gas and air piping systems, to prescribe where and to what extent the actual design for each of the numerous and diverse conditions of construction and operation shall exceed such minimum standards."

THE truth of the matter is that pipeline technology is improving so rapidly that the deliberate and

studied judgments of code committees cannot keep up with it. As new protective practices for pipe and pipe laying are developed, they are generally adopted by the industry, for the security of the line and its operating efficiency. The code will certainly be changed, and its requirements scaled upward in accordance with prevailing practices. In the meantime, the pipeliners insist that Federal, state, or local regulation, which would be detailed enough to have restrictive teeth in it, would actually slow the wheels of progress and hamper rather than hurry the movement toward greater pipeline safety.

There is a good deal of evidence to support this contention. It has been proved again and again that progress via government regulation is tedious and restrictive. Hundreds of communities have old, outmoded building codes which require slow, archaic, and expensive construction methods and materials. Newer, stronger, and cheaper materials are banned, regardless of quality and performance. Proposed code amendments become political footballs, and the public is the loser. The history of such regulation is consistent on this point.

INDIVIDUAL pipeline companies have installed many advancements on high-pressure lines to increase the safety factor. Many of them do not yet appear in the B31 Code or in any other standard or regulation. But all of them contribute something to the dependability of the line in operation. Here are a few of them: Hot wrapping of pipe with asbestos felt, glass fiber, and kraft paper keep out moisture and allay chemical action of the soil and ground conditions on the pipe. Cold bending of pipe in the field by special machine saves construction time and prevents loss of strength in the metal which would occur if the pipe were heated before bending. Cathodic protection by passing an electric current through the pipe counteracts electrolytic corrosion of pipe. Improved welding techniques and X-ray inspection systems lessen danger of line failures at the weld.

ALL these innovations are far beyond the experimental stage. They are accepted methods of operation. According to code authorities, they have not yet been incorporated into codes because sufficient data have not been assembled on the techniques to write a comprehensive minimum specification for each of them. This lag in code requirements is essential, they say, so that experience, rather than arbitrary slide-rule calculations, will show the allowable minimums.

An added protection, again not covered by any regulation or code provision, is provided by modern maintenance and operation techniques. Many lines now have microwave radio communications systems for their entire length, permitting instant communication between officers and compressor stations or mobile equipment. Constant patrolling of the pipeline right of way by airplane aids safety and insures continuity of operation by spotting leaks, erosions, or washouts all along the line. Maintenance crews on 24-hour duty are generally located at intervals along the line, and, using the radio equipment, can be moved rapidly at the first sign of trouble.

Then there are some practical rules

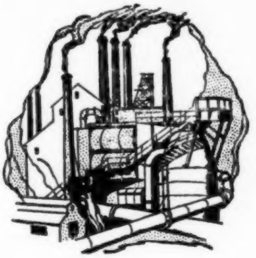
of thumb used by pipeliners as an extra safety factor. A few of them are:

Heavier pipe walls used in industrial or heavily populated areas; certain distances observed between line and near-by dwellings or inhabited buildings; extra depth (beyond standard 30 inches) and other precautions under highways, railroad tracks, and other thoroughfares; and modern lubricated plug valves to insure tight operation and positive shutoff in minimum time.

In view of these numerous instances of forethought and protection of the public on the part of pipeline companies, it would seem that the gas transmission industry has done itself a disservice, and endangered its own independence, by failure to defend itself against public criticism. The industry can obviously make out a good case for its positive efforts to reduce the frequency and severity of pipeline accidents. It has not done so, and the clamor has increased for regulation. A growing number of men in the industry are coming around to the idea that publicizing the facts would help regain public confidence. The American Gas Association has recently taken the lead in focusing national attention on the vast increase in safety factors of high-pressure gas pipelines.

In the meantime, local authorities are likely to take all steps necessary to increase protection of citizens in their jurisdiction. New York city, for example, is well advanced upon a safety code of its own for building and operation of natural gas pipelines. It calls for the filing of complete plans and specifications for every inch of the proposed line, and for the issuance of permits for construction and alteration of lines. Such plans are checked against the known local conditions before approval, so that possible hazardous situations can be avoided. The theory here is that local engineers might be aware of local conditions of electrolysis, water seepage, points of excessive vibration, and other potential danger spots, which would not be suitable locations for the laying of a gas pipeline. The New York city code, when finished, will be made available to any interested community for study and adoption if desirable.

It has been argued that scattered and nonuniform regulation of parts of high-pressure natural gas pipelines cannot be effective. This has been the position of those favoring the imposition of national safety regulations on the pipeline industry. A more realistic viewpoint is that a gas pipeline is a most complicated machine, which necessitates a thousand solutions to a thousand different problems of construction and operation. Once this viewpoint is established, it follows that scattered, local regulation can best deal with local situations. Every community should be assured that high-pressure pipelines crossing its borders are built at least to the minimum standards of all national safety codes that apply. Beyond that, local officials can seek assurances that every potentially hazardous local condition is brought to the attention of the pipeline builders. Mutual agreement can then be reached on solutions for each problem presented.



Underground Gas Storage Up to Date

Long before the atom bomb entered anybody's nightmares, gas utilities were working on practical plans for buying up holes in the ground. Today, underground storage of gas is an accepted fact.

By LARSTON D. FARRAR*

The underground storage of natural gas, a subject which was discussed in footnotes in annual reports of gas transmission and distribution companies only a few years ago, has grown so swiftly that, today, it is difficult to keep up with the salient developments in this particular field.

The American Gas Association, in a recent report on "the amazing growth of underground storage," stated that the number of natural gas "savings banks" in use has risen to more than 100—five times the 1940 total. But that was a report made in the spring. By now, no doubt, there are scores of other new underground storage pools in use, or about to be put into use, as gas management strives to keep up with the tremendous challenges posed by increased residential acceptance of natural gas.

The AGA Committee on Natural Gas Reserves indicated in latest official figures on underground storage that, at the close of 1950, no less than 341,690,000,000 cubic feet of natural gas were being stored underground in the United States. This represented a net addition of at least 54 billion cubic feet to underground storage pools during that year. The AGA estimated that of the more than $2.7 billion which the natural gas industry plans to spend (if the steel pipe shortage eases enough to permit) between 1950 and 1954, approximately half a billion dollars will go for underground storage facilities.

"This huge expenditure will be an important step in helping the natural gas industry to meet peak loads and

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to prepare against pipeline failures," the AGA noted. "Underground storage facilities will help to increase pipeline load factors and improve the industry's ability to serve the booming house-heating load."

A GOOD idea of how important natural gas distributing companies consider underground storage, may be obtained regularly by Washington correspondents who go through the voluminous releases issued by the Federal Power Commission and hundreds of other executive and legislative bureaus. It's possible to see such releases as the following (excerpted) sample items:

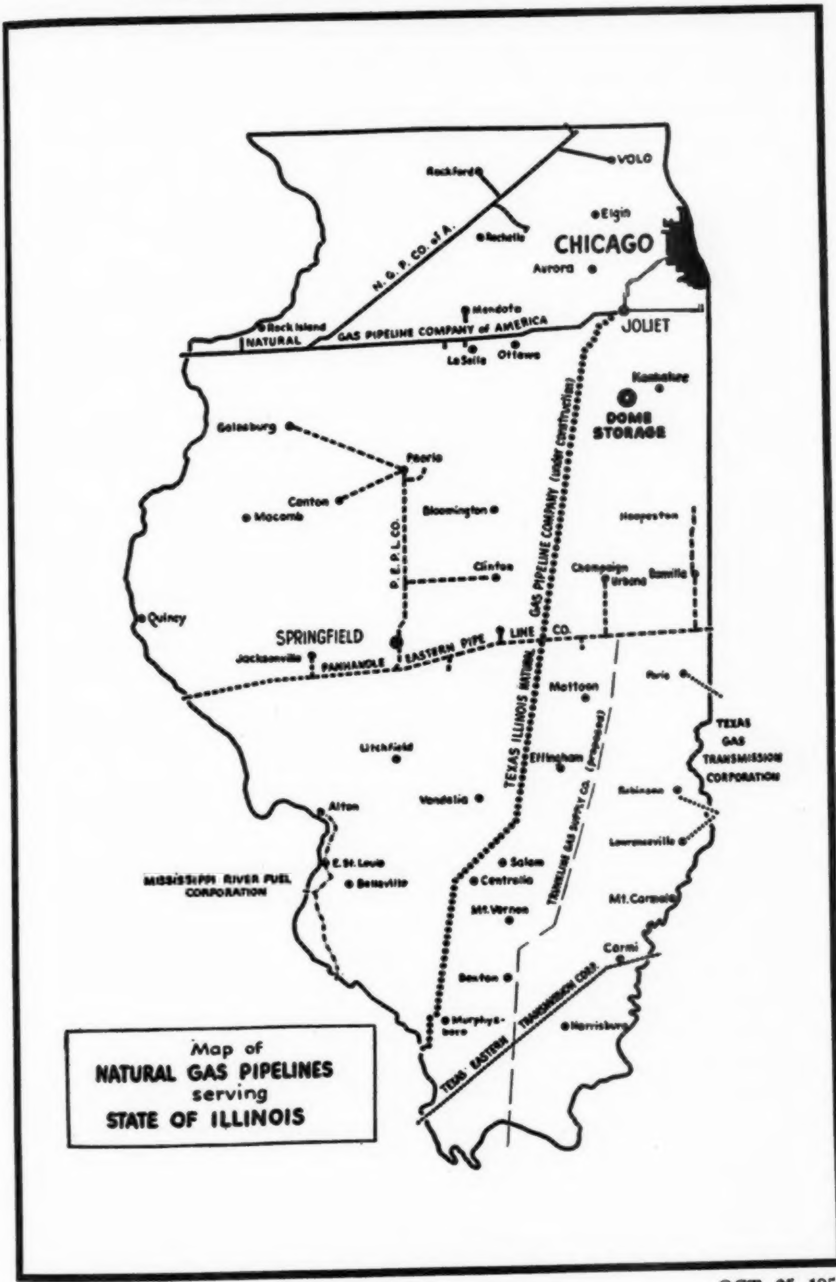
> Washington, D. C., June 1, 1951—The Federal Power Commission has authorized The East Ohio Gas Company, of Cleveland, Ohio, and New York State Natural Gas Corporation, of New York city, to construct and operate natural gas facilities, including pipelines in Ohio and Pennsylvania and *a storage area in Pennsylvania*.... (Italics ours.)

> Washington, D. C., August 17, 1951—The Federal Power Commission has issued a certificate of public convenience and necessity authorizing Mississippi River Fuel Corporation to construct and operate natural gas underground storage facilities in the Waterloo oil field in Monroe county, Illinois, about six miles from the company's Columbia measuring station and near its major market area in and near St. Louis, Missouri.
>
> Reservoir capacity of the storage project is estimated at 13,284,000,000 cubic feet; cushion gas required 1,329,000,000 cubic feet, leaving available for market 11,955,000,000 cubic feet. After the reservoir has been filled, the company estimates that a daily deliverability of 50,000,000 cubic feet can be obtained through the proposed 25 wells, on intermittent occasions, but that continuous withdrawals for more than a few days would probably reduce the daily deliverability of the edge wells and possibly all of the withdrawal wells. There is evidence indicating, however, that if the storage reservoir capacity developed approximates the currently estimated potential of about 13.2 billion cubic feet, the daily storage deliverability through the proposed 25 wells will not be less than 100,000,000 cubic feet per day. . . .

> Washington, June 1, 1951 — The Federal Power Commission has authorized The Ohio Fuel Gas Company, of Columbus, Ohio, to build pipeline facilities for the conversion of six natural gas-producing pools in Ohio to storage service. The pools have an ultimate storage capacity of approximately 35.7 billion cubic feet of natural gas. . . .
>
> To convert the pools, Ohio Fuel will build about 74.2 miles of high-pressure storage project pipelines, ranging in size from 3½ to 20 inches; construct a 47.5-mile, 20-inch line from Benton township in Hocking county to Columbus, and install an additional 8,480 horsepower in compressor capacity at existing stations. . . .

> Washington, D. C., June 1, 1951—The Federal Power Commission has authorized Tennessee Gas Transmission Company, of Houston, Texas ... and United Natural Gas Company, of Oil City, Pennsylvania, to construct facilities necessary to develop and utilize an underground storage area for natural gas in the Hebron field in Potter county, Pennsylvania. This storage project will increase Tennessee's peak-day delivery capacity to 1,595,000,000 cubic feet.

PERHAPS even more graphically than these announcements by the Federal Power Commission, a view of what the gas industry has been doing on underground storage and *why* may


VOLO
Rockford
Elgin
Rochelle
CHICAGO
Aurora
N. G. P. CO. of A.
Mendota
Rock Island
NATURAL GAS PIPELINE COMPANY of AMERICA
JOLIET
La Salle
Ottawa
Kankakee
DOME STORAGE
Galesburg
Peoria
Canton
Macomb
Bloomington
P. E. P. L. CO.
TEXAS ILLINOIS NATURAL GAS PIPELINE COMPANY (under construction)
Hoopeston
Clinton
Champaign
Urbana
Danville
Quincy
SPRINGFIELD
Jacksonville
PANHANDLE EASTERN PIPE LINE CO.
Mattoon
Paris
TEXAS GAS TRANSMISSION CORPORATION
Litchfield
Effingham
TRUNKLINE GAS SUPPLY CO. (proposed)
Robinson
Alton
Vandalia
Lawrenceville
E. St. Louis
Belleville
MISSISSIPPI RIVER FUEL CORPORATION
Salem
Centralia
Mt. Carmel
Mt. Vernon
Carmi
Benton
TEXAS EASTERN TRANSMISSION CORP.
Murphysboro
Harrisburg
Map of
NATURAL GAS PIPELINES
serving
STATE OF ILLINOIS

be obtained from an exclusive statement given to the PUBLIC UTILITIES FORTNIGHTLY by James F. Oates, Jr., of Chicago, Illinois, chairman of The Peoples Gas Light and Coke Company, and chairman of the board of the Natural Gas Pipeline Company of America and the Texas Illinois Natural Gas Pipeline Company.

"THE unprecedented demand for gas for space heating during the postwar years results both from public realization of the advantages of gas for space heating and the relatively low cost of gas in comparison to other fuels in many sections of the country," Mr. Oates pointed out.

"This demand has increased to a point where many state utility commissions have found it necessary to limit the attachment of additional space-heating customers in order to protect the rights of the general customers of the gas distribution companies and to prevent a complete breakdown of gas service to them.

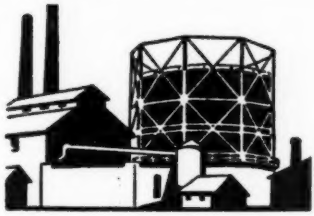
"The utilities and the pipeline companies realize, of course, their obligation to supply the public with as much gas as might be required if it is physically and economically possible to do so and have been bending their efforts in this direction.

"The first effort made was to get more gas into the areas through the building of additional pipeline capacity. It was obvious, however, that the building of more and more pipelines was not the answer. It is just not economically feasible to build these additional pipelines for space-heating business with its high peak demands in the winter and deep valleys in the summer, and resultant low-load factors for the pipelines. For instance, the annual load factor for space heating in the northern part of the country is only approximately 25 per cent.

"THE solution to the problem is theoretically very simple; that is, to store gas at reasonable expense near the markets during periods of low demand so that it will be available for use during peak periods in the winter season. In this way, the long-distance pipelines will have continuous economic operation and the additional pipelines necessary to bring gas from the storage area to the existing markets can be built without undue burden on the gas-consuming public.

"Certain companies have been very fortunate in having found near their market depleted oil and gas fields suitable for low-cost storage of gas. Unfortunately, no such fields are located near our markets, and thus it was necessary to study numerous possibilities and seek the advice of outside engineers and geologists in order to solve our storage problem. Three methods have been considered by our companies: (1) the storage of gas in liquid form; (2) the storage of gas in man-made limestone caverns below the surface of the earth; and (3) the storage of gas in salt-water-bearing porous sandstone located in a large dome-shaped, gas-tight rock formation deep below the surface of the earth. Tests to date indicate that the latter method, known as 'dome' or 'bubble' storage, has the most promise for utilities served by our pipeline companies.

"Competing fuel industries will not be injured if utilities can, by means of storage, meet the public demand for gas. Storage itself does not increase



Problems of Surface Storage

"GAS CAN be stored aboveground, but it is uneconomical for companies to do so, except to be used for extreme emergencies on the bitterest, coldest days of the year. Such aboveground storage includes gas holders, lengths of large-diameter pipe, or 'line packing'; I.E., raising gas pressure overnight in the delivery end of a line so there is more to be taken out the next day."

the total supply of gas brought to the markets but merely permits the seasonal redistribution of the gas being delivered. The shift, as the result of storage, is from industry which uses large volumes of gas in the summer at bargain rates, to the public which needs, demands, and deserves the gas for domestic use.

"The aggressiveness of the gas industry in meeting this challenge to supply more gas for space heating and the initiative displayed in finding new methods for underground storage of gas are excellent examples of the progress made by a dynamic industry in our American economy."

MR. OATES' reference to his company's efforts to find a new and untried way of storing natural gas in quantity reflects thinking on a long and stubborn problem. The gas industry as a whole has been watching the step-by-step developments made by The Peoples Gas Light and Coke Company, through its subsidiaries, in seeking a new departure to solve its storage problems. Literally everybody wants to know, just as quickly as the Chicago company officials find out, how successful the project turns out, when it is completed at long last.

Legislative as well as engineering history in this field likely has been made. Illinois on June 7, 1951, became the first of the northern states to pass such a law. The Illinois general assembly passed a bill, which became law without the signature of Governor Adlai Stevenson, giving The Peoples Gas Light and Coke Company, and its subsidiaries, the right to condemn for purposes of public convenience and necessity, subject to Illinois Commerce Commission approval, certain land in the state for purposes of underground storage of gas. The eminent domain privileges, of course, will be exercised only in the case of cloudy

titles or other unforeseen difficulties.

Shortly thereafter, the company appealed to the Illinois Commerce Commission for the right to use certain land in northeast Illinois for development of a storage field at a depth of some 1,600 feet below the surface of the ground. The company previously had pointed out many factors which involved the public convenience and necessity of the project, which ties in most closely with the bringing of natural gas to Illinois and marketing it to consumers in the state.

NATURAL gas reaches Illinois by several pipeline systems. The northern part of the state is served by Natural Gas Pipeline Company of America, which brings gas from the Panhandle field in northern Texas and the Hugoton field of Oklahoma for ultimate consumption in some 234 communities.

Central Illinois is traversed by the pipeline system of Panhandle Eastern Pipe Line Company, which brings gas from Kansas and Texas and serves some 61 cities in the state. The Mississippi River Fuel Corporation brings gas from the south and serves East St. Louis and other communities in Illinois. The system of Texas Eastern Transmission Corporation crosses the southern tip of the state and supplies natural gas to a number of communities in that area. The gas supply of this system originates in Louisiana and Texas. The Texas Gas Transmission Corporation serves communities in southeastern Illinois, with natural gas from Kentucky, Louisiana, and Texas.

A new pipeline, now being completed by the Texas Illinois Natural Gas Pipeline Company, enters the state near Cape Girardeau and runs northerly to Joliet, to bring gas from the Texas Gulf coast area to increase the gas available to cities now served by Natural Gas Pipeline Company of America and to make natural gas available to certain other Illinois cities not previously served with natural gas.

Another new pipeline, Trunkline Gas Supply Company, also being completed this year, enters the state near Metropolis and runs northerly to Tuscola to bring gas from Louisiana and Texas to increase the gas available to cities served by Panhandle Eastern Pipe Line Company.

THE utilities, of course, are concerned primarily with satisfying the needs of the householders and of commercial and industrial consumers whose needs require a continuous supply of gas, as contrasted with industrial consumers who buy on an interruptible basis. There is a tremendous unfilled demand for natural gas for house heating. House heating requires a great deal of gas in the winter and none in the summer. If gas transported into the state were used primarily to serve house-heating consumers, the pipeline would in substantial degree be idle in the summer and the cost of the gas to the consumer would be very high. To keep down this cost, the practice has been to develop an interruptible industrial load in order that the pipeline may be used more fully in the summer. This practice is general in the industry, and interruptible service is supplied where customers have an alternative type of fuel, such as coal or oil.

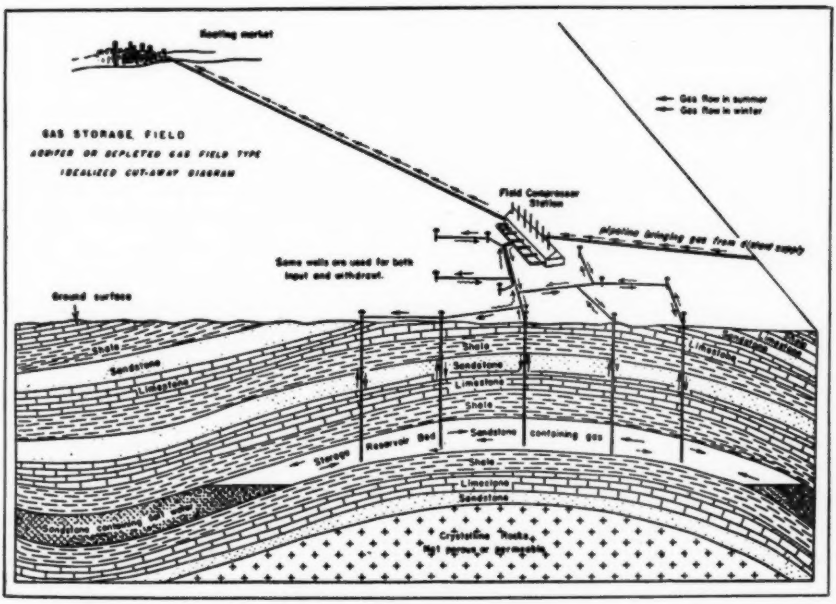
The practicality of continuing this process of balancing high-demand, low-annual use house-heating load by selling interruptible service gas at very low rates and in constantly increasing annual quantities has in recent years been subjected to question, particularly because of the tremendous increase in demand for gas for house heating.

That demand has been stimulated by the rising prices of oil and coal, by periodic interruptions in the supply of these fuels, by the national ready acceptance of natural gas, and by the cleanliness and convenience of the use of gas. As a result, the pipelines cannot deliver enough gas to the northern states to satisfy the demand for house heating during the winter months.

THE Illinois Commerce Commission has had occasion to issue orders authorizing the gas utilities to limit extensions of service to new house-heating customers. At the same time, that commission has been insistent that the utilities take all steps available to them to satisfy the full demand of all customers who desire service.

The utilities, in turn, have asked the pipelines to increase the quantity of gas available. The solution of the problem requires not only that more gas be brought into the area, but that some balancing method be found to accommodate both the high demand in winter and the low demand in summer.

In explaining its unusual storage projects and the necessary steps that



must be taken to assure its successful operation, The Peoples Gas Light and Coke Company made a statement to the Illinois legislature, in which it pointed out that "the theoretical solution of the distribution problem is clear."

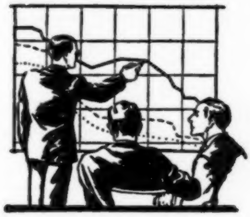
"That solution is to evolve a method of storing gas during the summer months when the demand is low, and subsequently withdrawing it from storage during the winter months when the demand is high. If such storage can be found at a point close to the markets, a number of short pipelines may be constructed, at relatively small cost, to deliver the gas from storage in the winter, with the result that it becomes economically possible to adjust the supply to the variation in demand during the seasons of the year. The practical solution is to find at reasonable cost, a method of storing large quantities of gas near the markets during the summer season. . . .

"STORAGE in underground formations will place little burden upon the landowners, and will not interfere with any resources of the state. The use, as such, of the storage facilities will not disturb the present use of the land and will deprive the landowners of nothing of actual benefit to them. The condemnation will deprive them of nothing except a theoretical but valueless right, which may be compared with the burden of allowing airplanes to cross the air above their land. In case of storage of water-filled domes, it will be necessary to drill wells at appropriate intervals on the surface for the inlet and outlet of the gas. Such wells will occupy little space and will be without derricks after completion. The necessary pipelines, which will radiate from a central point to the wells, will be buried under the ground, well below cultivation depth."

The statement went on to point out that such projects must be confined to formations at least 500 feet below the surface of the soil in order to assure the landowner that there is no unreasonable hazard. For the assurance that water resources will not be injured, the condemnation is conditioned upon a finding that no injury to water resources of the state will result. The condemnation is not permitted in respect to any geological formation containing oil, gas, or coal in commercial paying quantities.

THE bill passed by the Illinois legislature provides that any corporation whose underground storage project may be so approved by the state commerce commission may utilize the subsurface formations lying more than 500 feet below the surface of the soil, or real estate owned by the state of Illinois, or by any of its political subdivisions. Payment of reasonable compensation to such political subdivisions is required, as if the right were condemned. As a condition of the utilization of real estate owned by the state of Illinois, the corporation is required to pay the state treasurer a reasonable compensation therefor in an amount to be determined by the Illinois Commerce Commission.

The legislation encompasses not only storage rights, but also the right to condemn for pipeline purposes and any other need for the transportation of gas. Under Federal law, the right



Growth of Underground Storage

"THE *AGA Committee on Natural Gas Reserves indicated in latest official figures on underground storage that, at the close of 1950, no less than 341,690,000,000 cubic feet of natural gas were being stored underground in the United States. This represented a net addition of at least 54 billion cubic feet to underground storage pools during that year."*

already is given to condemn land for rights of way and station sites of natural gas pipelines, subject to the jurisdiction of the Federal Power Commission. (But the language is said clearly not to be broad enough to cover underground storage.) The law in Illinois previously granted eminent domain for certain purposes to local Illinois utilities, but its phrasing was said to be doubtful in respect to condemnation for pipelines. It was thought that to make everything clear to everyone, the bill should grant full power to all persons (local utilities or pipeline companies) transporting or storing gas for ultimate distribution in Illinois, to acquire any facilities found by the Illinois Commerce Commission to be required for public service.

FOR more than a year, the Texas Illinois Natural Gas Pipeline Company (a Peoples Gas affiliate) had conducted experimental drilling in various areas in Illinois, and had made numerous laboratory tests to determine the feasibility of large volume storage of gas in newly discovered fields never before holding gas. Company engineers and geologists believe they found extremely favorable conditions for large volume storage in a 15,000-acre area, 1,600 feet under the surface of Herscher, a town of 500 population in Kankakee county, Illinois. This is near the next Texas Illinois pipeline.

In this area, there is a geological formation technically known as an "anticline"—a kind of dome, in which the strata of hard rock are shaped like a turtle's back, except that the dome covers several hundred acres. In between the layers of hard "impermeable" rock are wide layers of porous and permeable sandstone, containing a heavy concentration of salt water.

The idea behind the storage plan is

that gas can be pumped down into the porous sandstone containing salt water, forcing the water outward under pressure, the gas forming a "bubble" at the top of the dome. The stored gas would be the same as that in a natural gas well, except that the gas would be placed there artificially, of course.

The particular area already explored and tested covers some 15,000 acres, and it is believed that the sandstone will hold in effective storage about 90 billion cubic feet of gas, about equal to the total gas sendout of Peoples Gas for the year 1950. The storage gas may be delivered at the rate of about 1.5 billion cubic feet in a day, and it will serve other areas than Chicago.

A NEW subsidiary has been formed by Peoples to be known as the Natural Gas Storage Company of Illinois. This organization, under the same management as that of the Texas Illinois Natural Gas Pipeline Company, will construct and operate the storage facility, including a pumping station and auxiliary equipment for removing moisture from the gas.

If the storage plan operates as expected, it will presage, no doubt, a widespread geologic and engineering search for similar "domes" for "bubble" storage of natural gas in the industrial areas of the East, West, and Middle West.

On the basis of geological investigations and engineering plans, the "Herscher Dome" project will cost at least $25,000,000, perhaps more.

However, in the happy event that this project materializes as planned, it will be at least a year, and possibly two years, before its full benefits become apparent to Illinois consumers.

The biggest single underground storage project to open this year is the field at Oakford, Pennsylvania, near Pittsburgh, on which the Consolidated Natural Gas Company and the Texas Eastern Transmission Corporation are jointly financing a $40,000,000 venture. Using a depleted field and its existing wells, the two companies believe that when finally completed in two years, this field will store 105 billion cubic feet of gas, of which some 45 billion cubic feet will be "cushion"; *i.e.*, the amount of gas that must be left in a field to be sure the pressure is great enough to "send" the other gas to the surface and through the lines. The 60 billion cubic feet of usable storage will be available at a maximum rate of 400,000,000 cubic feet daily.

It is planned that ultimately this project will have 300 horsepower of compressor capacity to shove the gas into the ground and draw it out again at the controlled rate of flow.

GAS *can* be stored aboveground, but it is uneconomical for companies to do so, except to be used for extreme emergencies on the bitterest, coldest days of the year. Such aboveground storage includes gas holders, lengths of large-diameter pipe, or "line packing"; *i.e.*, raising gas pressure overnight in the delivery end of a line so there is more to be taken out the next day. But the capital costs of aboveground storage are too high for really volume storage. It costs $50 to $100 per thousand cubic feet for bottle holders; around $200 per thousand cubic feet for water-seal holders;

about $70 for pipe holders; and about $300 for high-pressure holders, not counting the annual costs on such equipment.

On the other hand, underground storage can be had at costs ranging from 2 cents to 53 cents per thousand cubic feet. It's obvious why the companies prefer old fields, or, like many companies are doing who cannot find old fields, are looking for new ways of storing gas.

It isn't difficult for anyone doing research in underground storage to find evidence that only a daily ticker service could keep up with *all* the developments in this field.

In Indiana, the Citizens Gas & Coke Utility of Indianapolis is planning to use an old gas field east of the city, which stimulated industrial growth in that area sixty years ago. Some half-billion cubic feet of gas will be stored 1,000 feet underground in this old field, according to plans.

The Transcontinental Gas Pipe Line, which transports gas from Texas to New York, has been prospecting for underground sand beds in New Jersey, Maryland, and Delaware for summer storage of gas. It is willing to lay 25 miles or more of feeder pipe in order to reach the "way depot" on the route to the biggest city on earth. This already is being done successfully by the Louisville Gas & Electric Company in the Doe Run and Mulbraugh fields in northern Kentucky.

Texas Gas Transmission Corporation is developing a $939,000 underground gas storage field near Petersburg, Indiana, to be known as the Alford storage field. It will hold four billion cubic feet of gas, with 16½ miles of lateral and gathering lines, a 1,200-horsepower compressor to pump gas into or out of the field, and a measuring station.

The 1950 annual report of The Columbia Gas System devotes quite a few of its "questions and answers" to underground storage of gas. The company presents its facts for stockholders in a manner both interesting and informative. Some of the questions and answers are as follows:

> How is gas stored underground?
> The system has been producing gas in the Appalachian area for many years. Its own, as well as state and Federal, geologists and engineers, have developed maps of underground rock strata which show the gas-yielding sands. When one of these areas has yielded part or all of the original gas, held there for millions of years, the structure can, in many instances, be converted to a storage reservoir. Even extra wells may be drilled to increase flow. Compressors force gas

¶ "THE *bill passed by the Illinois legislature provides that any corporation whose underground storage project may be so approved by the state commerce commission may utilize the subsurface formations lying more than 500 feet below the surface of the soil, or real estate owned by the state of Illinois, or by any of its political subdivisions.*"

underground, where it is held under high pressure. In the winter, when gas is needed, the wells are turned into the transmission systems, the gas, in most cases, being forced out by the underground pressure.

Is all the gas stored underground removed in a single season?

No. Although all of the gas can ultimately be recovered, efficient operation requires substantial quantities as a "cushion" to maintain high pressures. The problem is to get gas quickly to meet heavy requirements during the heating season. The higher the underground pressure, the higher the rate at which gas can be delivered from storage wells.

How much gas did we have in underground storage in 1950?

At November 1, 1950, we had 128 billion cubic feet in storage. During November and December, 22 billion cubic feet were withdrawn and 106 billion cubic feet remained in storage at the close of the year. Further withdrawals will be made during the first part of 1951. By the end of the heating season, we expect to have 79 billion cubic feet remaining in storage.

Is underground storage an expensive operation?

No, especially when you measure the costs against the much higher cost of purchasing southwest gas only as needed (as the engineer says, "at a poor load factor"). By taking capacity deliveries from our southwest suppliers the year round, we minimize their investment in pipeline facilities and we are thus able to buy southwest gas at the lowest possible price. Presently we have about $34,000,000 invested in underground storage. During the current (1950-1951) winter, we have taken as much as 842,000,000 cubic feet from storage in a single day. To build southwest pipelines with the ability to deliver this amount in a single day would cost several hundred million dollars. That is many times the amount we have invested in storage facilities.

Have we completed our underground storage program?

Certainly not. As our heating customers and seasonal demands increase, so do our requirements for underground storage. So we must continue to expand our underground storage operations to keep pace with demands.

EQUITABLE GAS COMPANY of Pittsburgh, in its annual statement, reported spending some $650,000 on new development related to underground storage of gas in 1950. It added that "substantial additions to gas storage are anticipated each year. . . . *The program is an ambitious one, but the importance of storage expansion to the continued growth of the system cannot be overemphasized.*" (Italics supplied.)

GAS *utility companies in the United States today serve about 24,362,000 customers, including 331,000 LP-gas (bottled gas) customers served directly by gas utilities. Natural gas serves as a fuel for 14,894,000 of these customers; 7,197,000 customers receive manufactured gas and 1,940,000 customers are served with mixed gas. During the next three years, because of the rapid expansion of natural gas systems, important changes will be effected in all three classifications. Many of the straight manufactured gas companies will become straight natural gas companies or will use natural gas to mix with present manufactured gas to a degree that will classify them as mixed gas companies.*

Financial News and Comment

By OWEN ELY

Downward Trend of Earnings Stresses Importance of Rate Increase Proceedings

THE table on page 588 shows the monthly trend of net income for the larger electric utilities and natural gas utilities in 1951. The monthly changes are the real indicators of the trend—not the twelve months' figures, either for utilities as a whole or for individual companies.

The electric utilities showed monthly declines in net income as compared with last year in five out of seven months, with one month about even, and February showing a slight gain. The natural gas utilities started out with substantial gains for January and February (possibly due to weather conditions) but the figures have grown progressively worse with a decline of 18 per cent in June. (July is not yet available.)

It is of course quite "rule of thumb" to consider the percentage comparison with last year as a trend index, since last year's figures may have been abnormal in some respects, but nevertheless this is the customary method of appraisal. The analyst is usually familiar with the general showing made in the previous year as a whole, and monthly aberrations are ironed out sooner or later. However, to use the monthly dollar figures themselves as indicative of a trend would of course be misleading because they are not adjusted for seasonal trends. Most electric and gas companies (particularly the latter) present a poorer earnings picture in the summer months when loads are lower.

The figures are also deficient in that they do not reflect, but only illustrate, the trend of per-share earnings. No figures are compiled monthly for the increase in the number of outstanding shares, for either the electric or the natural gas industries. In the first half of 1951 the electric utilities sold $224,000,000 worth of common stock—about 29 per cent of their total financing. This would probably reflect an increase in the number of shares (over the same period of 1950) of at least 5 per cent. On this basis the decrease in net income of 7 per cent in July would be converted into a *decrease of some 12 per cent in per-share earnings.* This is not very accurate because no adjustment has been made for the change in preferred dividend pay-

DEPARTMENT INDEX

ments, but it will serve to illustrate the marked downward trend. The increase in the number of shares for the gas industry was doubtless smaller, since gas utilities sold only $70,000,000 of common stock in the first half of this year.

OBVIOUSLY, the monthly trends have not yet been fully reflected in the earnings statements issued by individual companies. Unfortunately, very few of them issue monthly earnings figures as all the railroads do, despite the fact that they have to compile such figures for the Federal Power Commission. In the twelve months' cumulative figures the downward trend has been somewhat concealed, because there had previously been an uptrend and the two trends have become mixed.

There has been some expression of opinion that, because last year during July-September there was a sudden increase in tax accruals (adjusted on a retroactive basis), this year's comparisons for the second half won't prove too bad; but it must be kept in mind that retroactive adjustments will also be made this year (either to April 1st or January 1st) as soon as the new tax bill is passed. It now looks as though accurate adjustments cannot be made until the October or November statements are released, though some companies have already been making some retroactive adjustments to ease the later blow. While there have been some hopes pinned on the savings due to anticipated omission of the 3⅓ per cent tax on electrical energy (which applies to residential and some commercial revenues), this saving will *not* be retroactive and may not begin before November 1st or later, so that 1951 benefits will be relatively small.

IT looks as though there won't be much help from rate increases either, this year. For example, the New York state commission has refused to grant rate increases based on the pending tax bill despite its retroactive character. In the Rochester Gas & Electric Case, decided July 9th, the commission granted a 6 per cent increase in electric rates compared with the 11.48 per cent asked by the company. The requested increase was based on the assumption that the Federal income tax rate would be fixed at 55 per cent, but the commission stated that "no increase can be granted predicated upon the assumption of an event that may or may not happen." While the commission acted correctly, perhaps, in refusing to assume that the tax would be fixed at such a high rate, it apparently refused to recognize that *some* increase was almost inevitable and that the company was entitled to temporary protection because of the retroactive character of the tax increase and the resulting effect on published earnings. In fact, that assumption seemed inconsistent with the commission's expressed desire to aid the company in its financing program—which desire indicates a very constructive attitude by this commission *if geared to the actual trend of events.* The commission stated:

MONTHLY TREND OF NET INCOME

	Class A & B Natural Gas Utilities				*Class A & B Electric Utilities*			
	12 Months		*1 Month*		*12 Months*		*1 Month*	
	Mill.	*% Change*	*Mill.*	*% Change*	*Mill.*	*% Change*	*Mill.*	*% Change*
January	$184	30%	$27	15%	$822	7%	$77	D 2%
February	188	31	27	19	824	6	81	3
March	188	26	23	D 1	823	6	72	—
April	187	20	20	D 4	819	4	71	D 5
May	185	14	14	D10	810	1	61	D10
June	183	9	9	D18	805	1	63	D 6
July	171	7	6	D 5	801	D 2	57	D 7

D—Decrease.

The company, in fulfilling its obligation to render adequate service to the public and in striving to do its share to avert the ever-increasing shortage in electric power supply now threatening an important industrial area, is undertaking a vast construction program. That program includes expanded distribution facilities as well as a new steam-generating unit and involves, approximately, the doubling of the company's present investment in electrical plant. The only source of funds to finance the expansion is the sale of securities. Securities cannot be sold without payment of interest or dividends. These are nonexistent without net income, so that but one question remains for determination—how much income is required? To put the question in slightly different words—what rate of return do investors demand for the quality of security to be offered for sale? . . .

The common stock of the company is bought and sold daily in the market place. On the sixth day of July, 1951, the investor bought it upon a yield basis of a minor fraction under 7 per centum. It follows, therefore, that if the company under present market conditions is to attract necessary capital to finance its program of expansion (having already approximated the desirable limit of borrowing capacity), it must be permitted a sufficient net income to continue that yield with a fair margin of safety. Under such circumstances and under conditions presently existing, rate of return becomes largely a matter of calculating mathematically the percentage of increase in electric rates required to produce that result. This we find to be 6 per centum.

THE question of retroactive taxation *versus* increased rates has already been discussed in the FORTNIGHTLY (August 30th) by Richard L. Rosenthal, president of Citizens Utilities Company. Obviously, the failure of the state commissions to recognize the impact of such taxes on earnings and on the utilities' financing problems, does not square with either the legislative policy of "fair return" or with the statement by Chairman Hessey of the Maryland Public Service Commission (representing NARUC in the Senate tax hearings) already quoted in this department. Mr. Hessey stated that if the utilities do not obtain necessary rate relief from the commissions, "resort could be had to the state and Federal courts."

*UTILITY NEW-MONEY FINANCING

	September	*1951 to Date*	
	Mill.	*Mill.*	*% Increase Over 1950*
Gas Utilities			
Bonds	$75	$544	7%
Preferred	—	33	D13
Common	9	78	62
	$84	$655	9%
Electric Utilities			
Bonds	$27	$566	D11%
Preferred	—	41	D76
Common	18	254	23
	$45	$861	D15%
Total Gas and Electric	$129	$1,516	D 6%

*As compiled by the Irving Trust Company. D—Decrease.

Utilities which plan to file applications for increased rates should not wait until the President signs the new tax bill, or until their earnings actually reflect the higher taxes, but should begin doing their "homework" as soon as possible, so that *pro forma* earnings figures (adjusted for the new tax bill) will be readily available as the principal exhibit in their application. Instead of depending solely on the past record of earnings, the utilities should undertake to educate the commissions as to the necessity of using projected estimates of earnings as the basis for rate relief. While such forecasts must necessarily be somewhat inaccurate, this can be taken care of by projecting minimum and maximum estimates for the guidance of the regulatory commission, which can then exercise its discretion as to which basis to follow.

As pointed out in the *PUR Executive Information Service* weekly letter of September 21st, the FPC is now faced with a huge backlog of requests for natural gas rate increases. For some time the commission's press releases have been full of items about rate applications being proposed, suspended, etc. There are now about $115,000,000 of these proposed rate increases, which amount might be equivalent to about 8 per cent increase in the annual revenues of the natural gas companies.

It is true that many of these increases can automatically go into effect under bond if they are not acted on by the commission within five months. But most of them are in the *wholesale* service category, and each one may therefore involve many applications for higher *retail* rates before the state commissions.

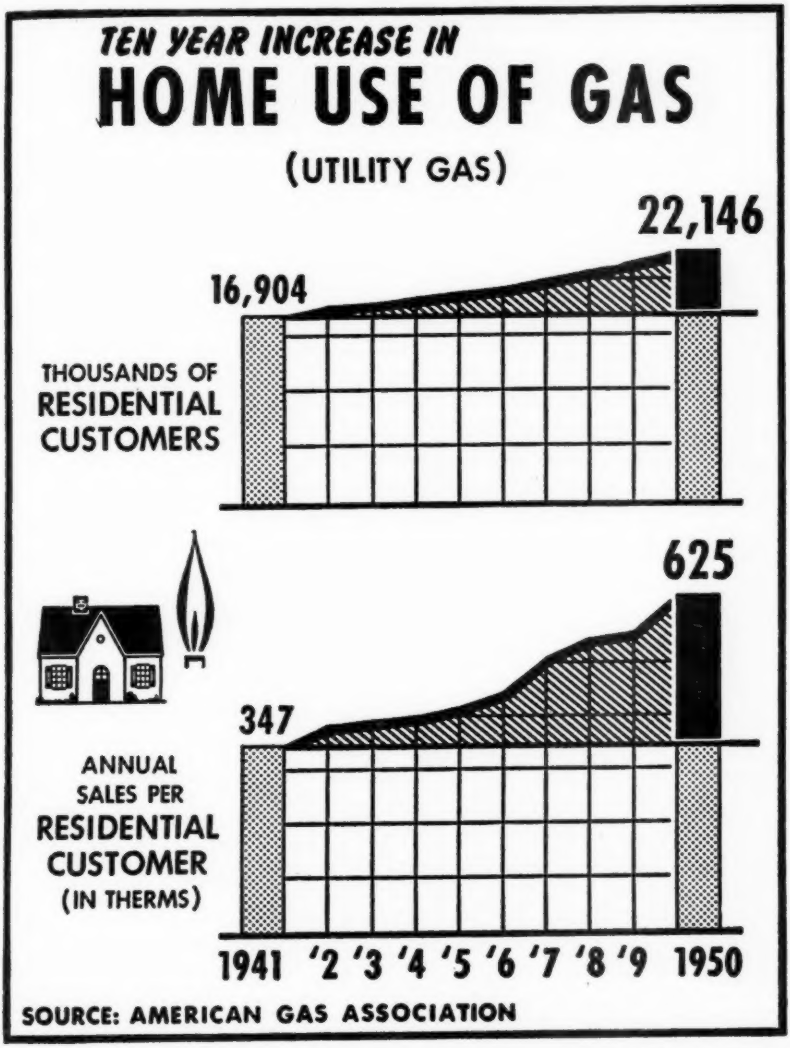
For example, Tennessee Gas Transmission has increased its wholesale rates (under bond) and one of its major customers is Columbia Gas System. Columbia Gas in turn has 80 wholesale customers, including Cincinnati Gas & Electric, Dayton Power & Light, Washington Gas Light, and 77 other companies and municipalities. This means that if Columbia raises its wholesale rates to compensate for the increase by Tennessee Gas, each of its 80 wholesale customers may in turn be required to seek increases in retail rates. Moreover, the same principle applies to other wholesale customers of Tennessee. Obviously the rate issue in the gas industry has tremendous ramifications—far more so than in the electric light and power industry, where sales at wholesale are a smaller factor.

It is obvious that both Federal and state commissions are going to be overloaded with work during the coming year or so, and every means should be sought to streamline and expedite the various rate applications, in order that utility earnings will not suffer too much and thereby cripple the necessary sale of new securities for the defense construction program. The granting of temporary increases (under bond or with increased revenues escrowed) would be one means of gaining this end, but might be of

CURRENT YIELD YARDSTICKS

		1951 Range		1950 Range	
	Recent	*High*	*Low*	*High*	*Low*
U. S. Long-term Bonds—Taxable	2.61%	2.70%	2.39%	2.42%	2.15%
Utility Bonds—Aaa	2.87	3.09	2.64	2.69	2.55
—Aa	2.93	3.18	2.70	2.74	2.63
—A	3.15	3.32	2.82	2.87	2.75
—Baa	3.43	3.54	3.21	3.21	3.14
Utility Preferred Stocks—High-grade	4.01	4.10	3.77	3.82	3.70
—Medium-grade	4.41	4.48	4.19	4.25	4.13
Utility Common Stocks	5.66	6.11	5.62	6.43	5.31

Latest available Moody indexes are used for utility bonds and preferred stocks; Standard & Poor's indexes for government bonds and utility common stocks.



DURING the past decade, the gas utility industry has added an average of more than 500,000 new residential customers per year. Significantly, the number of domestic gas customers increased more than 35 per cent from 1941 to 1950 inclusive, while total family units in the United States advanced only 22 per cent, according to the Census of Housing. During the same 10-year period, gas use per residential customer rose more than 80 per cent, reflecting the expanded availability of natural gas, greater use of gas for house heating and for such newer uses as air conditioning, clothes drying and incineration.

dubious value in selling securities since the increased earnings would carry a question mark. Prompt commission action in granting bona fide increases, where needed, is the best solution.

Equitable Gas Company

EQUITABLE GAS COMPANY was formerly one of the gas subsidiaries of Philadelphia Company, subholding company in the Standard Gas system. The setup of this group of natural gas companies (producing and distributing) was revamped in 1950, making Equitable Gas the top company of the gas system, and the entire stock of Equitable was sold to the public at $24.25 per share in March, 1950. The stock has been selling recently on the Stock Exchange around 21½, and pays $1.30 to yield 6 per cent.

President A. W. Conover recently gave an address before the New York Society of Security Analysts, and a brochure containing his talk, with numerous tables and charts, was presented to members. He pointed out certain basic advantages which the company enjoys over other integrated gas systems, as follows:

(1) Equitable Gas in 1950 obtained only 22 per cent of its gas from southern pipelines—61 per cent was obtained from its own Appalachian wells and 17 per cent from other producers in that field. The company can, if necessary, vary its production from its own wells, and contracts with other Appalachian producers are also flexible (without liability for demand charges). Other distributing companies in the East have to obtain as much as 60-75 per cent of their total supply from the southern pipelines. However, as the Appalachian reserves are gradually being exhausted, Equitable will increase its pipeline purchases as much as possible, obtaining perhaps 24 billion cubic feet this year compared with 14 billion last year.

(2) While Equitable does not have gas storage facilities aboveground, it has considerable underground storage in old wells. (It pioneered in this move.) Gas in storage at the beginning of winter has increased from 1.4 billion cubic feet in 1936 to 16.6 billion last year, and an estimated 23 billion this year; and the company hopes to reach 35 billion by 1955, which would permit handling a considerable expansion in house-heating business, etc.

(3) Another advantage is the fact that 90 per cent of all retail customers are located in the Pittsburgh area. The compactness of the distribution system makes the system more closely knit than most gas distributors; the investment in distribution facilities is relatively low per unit of output.

(4) Another advantage of this distribution system in Pennsylvania is that much of the property is still of the low-pressure type. Some conversion to medium pipe and pressure distribution has been made by reconditioning lines, etc., and the effect has been to increase capacity at very low cost. Only about 25,000 out of 213,000 Pennsylvania customers are thus far served by medium-pressure distribution, hence conversion can be extended to many other lines without heavy increase in cost, though it will be necessary to build additional feeder lines.

(5) Equitable has low retail rates—low in relation to those of the two other gas companies in the same area (Consolidated and Columbia) and also low in relation to competitive fuel prices, including electricity. If the company should find it necessary to seek higher rates, this would not disturb the competitive position.

(6) There is a large unsatisfied demand for gas in the territory served, due to low rates, difficulties with other fuels, and the high level of consumer income which has facilitated conversion to gas. President Conover estimated that if gas and distributing facilities were available, the demand by *present* Pennsylvania retail customers by the end of 1955 would show an increase of 52 per cent over the present level, and including new customers the gain would be 80 per cent. But the question of "how much" and "when" this potential load should be acquired, to assure maximum profits, is

being investigated by the company.

(7) There should also be substantial opportunities for administrative and operating economies. The company began to install machine billing in 1950 and the program is not complete. Administrative costs and operating efficiency will improve when the scattered staff and office employees are brought together in one building in 1952. For some time prior to the reorganization of the Equitable Gas System employee morale was at low ebb, due to threatened breakup of the Philadelphia Company. Progress is now being made toward recruiting and training adequate supervisory personnel.

FINANCIAL DATA ON ELECTRIC UTILITY STOCKS

		9/26/51 Price About	Indicated Dividend Rate	Approx. Yield	Share Earnings* Cur. Period	% Increase	Price-Earnings Ratio	Div. Pay-out
	Revenues $50,000,000 or over							
S	American Gas & Elec.	59	$3.00&Stk	5.1%	$4.41ju#	13%	13.4	68%
B	Boston Edison	45	2.80	6.2	3.00je	—	15.0	93
S	Central & South West	15	.90	6.0	1.44je	1	10.4	63
S	Cincinnati G. & E.	38	2.00	5.3	2.83je	D3	13.4	71
S	Cleveland Elec. Illum.	47	2.40	5.1	3.65je	11	12.9	66
S	Commonwealth Edison	31	1.80	5.1	2.12je	2	14.6	85
S	Consol. Edison of N. Y. ..	32	2.00	6.3	2.32je	D3	13.8	86
S	Consol. Gas of Balt.	26	1.40	5.4	1.74je	D7	14.9	80
S	Consumers Power	34	2.00	5.9	2.84ag	12	12.0	70
S	Detroit Edison	22	1.20	5.5	1.73ag	D3	12.7	69
C	Duke Power	81	4.75	5.9	7.29je	D16	11.1	65
S	Florida P. & L.	24	1.40	5.8	2.40je	D1	10.0	58
S	General Pub. Util.	19	1.20	6.3	1.83je	D12	10.4	66
S	Middle South Util.	19	1.20	6.3	1.74ag	4	10.9	69
S	New England Elec. System	12	.80	6.7	1.30je	D7	9.2	62
S	N. Y. State E. & G.	27	1.70	6.3	1.91ag	D8	14.1	89
S	Niagara Mohawk Power ..	24	1.40	5.8	1.93je	D6	12.4	73
S	North American	18	1.20	6.7	1.36je	D3	13.2	88
O	Northern Ind. P. S.	22	1.40	6.4	2.21ag	8	10.0	63
S	Northern States Power ...	10½	.70	6.7	.92je	D9	11.4	76
S	Ohio Edison	33	2.00	6.1	2.79ju	3	11.8	72
S	Pacific G. & E.	33	2.00	6.1	2.02je†	D3	16.3	99
S	Penn Power & Light	26	1.60	6.2	2.35ag	—	11.1	68
S	Philadelphia Electric	28	1.50	5.4	2.08je	D4	13.5	72
S	Pub. Serv. E. & G.	23	1.60	7.0	2.05je	NC	11.2	78
S	So. Calif. Edison	34	2.00	5.9	2.78	D2	12.2	72
S	Southern Company	12	.80	6.7	1.01ag	2	11.9	79
S	Texas Utilities	30	1.68	5.6	2.42ju	2	12.4	69
S	Virginia Elec. & Power ...	21	1.20	5.7	1.69ju	8	12.4	71
S	West Penn Elec.	28	2.00	7.1	3.09ju	4	9.1	65
S	Wisconsin Elec. Power ...	21	1.20	5.7	1.88je	—	11.2	64
	Averages			6.0%			12.2	73%
	Revenues $25-$50,000,000							
S	Carolina P. & L.	33	$2.00	6.1%	$3.07ag	13%	10.7	65%
O	Central Ill. P. S.	18	1.20	6.7	1.58je	10	11.4	76
O	Connecticut L. & P.	15	.90	6.0	1.04ag	10	14.4	87
S	Columbus & S. Ohio Elec. ..	20	1.40	7.0	1.96je	D8	10.2	71
S	Dayton P. & L.	34	2.00	5.9	2.90je	5	11.7	69
S	Gulf States Util.	22	1.20	5.5	1.65ju	—	13.3	73
S	Houston L. & P.	18	.80	4.4	1.36ag	3	13.2	59
S	Indianapolis P. & L.	35	2.00	5.7	3.26je	25	10.7	61
S	Illinois Power	35	2.20	6.3	2.84ju	11	12.3	77
S	Kansas City P. & L.	26	1.60	6.2	2.00ag	2	13.0	80
S	Kansas Pr. & Lt.	16	1.12	7.0	1.38je	D5	11.6	81
S	Long Island Lighting	14	.80	5.7	1.17je	17	12.0	68

	(*Continued*)	9/26/51 Price About	Indicated Dividend Rate	Approx. Yield	Share Earnings* Cur. Period	Share Earnings* % Increase	Price-Earnings Ratio	Div. Payout
S	Louisville G. & E.	34	1.80	5.3	3.12je	D6	10.9	58
S	Montana Power	25	1.60	6.4	2.55ju	D8	9.8	63
O	New England G. & E.	14	1.00	7.1	1.24ag	—	11.3	81
O	New Orleans Pub. Serv.	40	2.25	5.6	2.79ju	D9	14.3	81
S	Oklahoma G. & E.	21	1.30	6.2	1.74je	—	12.1	75
S	Potomac Elec. Power	14	.90	6.4	1.01je	15	13.9	89
S	Pub. Serv. of Colo.	26	1.40	5.4	2.08ju	NC	12.5	67
S	Pub. Serv. of Ind.	28	1.80	6.4	2.36ju	12	11.9	76
O	Puget Sound P. & L.	18	.80	4.4	1.72ju	D7	10.5	47
S	Rochester G. & E.	33	2.24	6.8	2.72je	1	12.1	82
O	San Diego G. & E.	13	.80	6.2	1.13ju	D9	11.5	71
S	Toledo Edison	10½	.70	6.7	.90je	D15	11.7	78
O	West Penn Power	35	1.80	5.1	2.36je	21	14.8	76
	Averages			6.0%			12.1	72%
	Revenues $10-$25,000,000							
S	Atlantic City Elec.	22½	$1.30	5.8%	$1.58ag	9%	14.2	83%
C	California Elec. Pr.	7	.60	8.6	.56je	D31	12.5	107
O	Calif. Oregon Power	25	1.60	6.4	1.87ag	NC	13.4	86
O	Central Ariz. L. & P.	12	.80	6.7	.96ju	D12	12.5	83
S	Central Hudson G. & E.	10	.60	6.0	.70je	—	14.3	86
O	Central Ill. E. & G.	24	1.30	5.4	2.37je	D4	10.1	55
S	Central Ill. Light	35	2.20	6.3	2.92ag	15	12.0	75
O	Central Maine Power	18	1.20	6.7	1.59ju	2	11.3	75
O	Connecticut Power	35	2.25	6.4	2.48je	D1	14.1	91
S	Delaware P. & L.	23	1.20	5.2	1.99je	14	11.6	60
S	Florida Power Corp.	18	1.20	6.7	1.38je	D9	13.0	87
C	Hartford Elec. Light	47	2.75	5.8	2.96je	3	15.9	93
S	Idaho Power	38	1.80	4.7	2.76je	D4	13.8	65
O	Interstate Power	8	.60	7.5	.80je	D11	10.0	75
O	Iowa Electric L. & P.	13	.90	7.0	1.30ju	D13	10.0	69
O	Iowa Pub. Service	19	1.20	6.3	1.81ag	D20	10.5	66
S	Iowa-Illinois G. & E.	25	1.80	7.4	2.36je	D12	10.6	76
S	Iowa Power & Light	21	1.40	6.7	1.94je	6	10.8	72
O	Kansas Gas & Elec.	33	2.00	6.1	3.09ag	3	10.7	65
O	Kentucky Utilities	16	1.00	6.3	1.52ju	NC	10.5	66
S	Minnesota P. & L.	32	2.20	6.9	3.23ag	D2	9.9	68
C	Mountain States Power	11	.84	7.6	1.21je	17	9.1	69
O	Otter Tail Power	20	1.50	7.5	1.86ju	D5	10.8	81
O	Pacific P. & L.	14	1.10	7.9	1.61je	10	8.7	68
O	Portland Gen. Elec.	28	1.80	6.4	2.75ag	3	10.2	65
O	Public Service of N. H.	25	1.80	7.4	1.91ag	—	13.1	94
S	Scranton Elec.	14	1.00	7.1	1.20ju	D6	11.7	83
S	So. Carolina E. & G.	8½	.60	7.1	.58je	D39	14.7	103
S	Southern Indiana G. & E.	21	1.50	7.1	2.03ag	D6	10.3	74
O	Southwestern Pub. Serv.	17	1.12	6.6	1.28ju	2	13.3	88
C	Tampa Electric	37	2.40	6.5	3.05ag	D9	12.1	79
O	United Illum.	42	2.40	5.7	2.84d	6	14.8	85
S	Utah Power & Light	28	1.80	6.4	2.72ag	5	10.3	66
O	Western Mass. Cos.	31	2.00	6.4	2.28ag	D15	13.6	88
O	Wisconsin P. & L.	17	1.12	6.6	1.40je	D8	12.1	80
	Averages			6.6%			11.9	78%
	Revenues $5-$10,000,000							
O	Arkansas Missouri Power	15	$1.00	6.7%	$1.53je	31%	9.8	65%
O	Central Louisiana Elec.	30	1.80	6.0	2.93je	NC	10.2	61
O	Central Vermont P. S.	11	.76	6.9	.94ag	D9	11.7	81
C	Community Pub. Ser.	12½	.90	7.2	1.15je	D15	10.9	78
O	El Paso Electric	40	2.00	5.0	3.51ju	4	11.4	57
S	Empire Dist. Elec.	18	1.40	7.8	1.88je	D18	9.6	74
O	Iowa Southern Util.	17	1.20	7.1	1.68ag	D9	10.1	71

	(*Continued*)	9/26/51 Price About	Indicated Dividend Rate	Approx. Yield	Share Earnings* Cur. Period	Share Earnings* % Increase	Price-Earnings Ratio	Div. Pay-out
O	Lawrence G. & E.	36	2.40	6.7	3.10d	6	11.6	77
O	Lynn G. & E.	31	2.00	6.4	2.12d	9	14.6	94
O	Madison Gas & Elec.	31	1.60	5.2	2.31d	22	13.4	69
O	Northwestern P. S.	11	.80	7.3	1.29je	—	8.5	62
C	Penn Water & Power	37	2.00	5.4	2.23d	5	16.6	90
O	Pub. Ser. of New Mexico	18	1.00	5.6	1.61je	5	11.2	62
O	Rockland L. & P.	10	.60	6.0	.72je	3	13.9	84
S	St. Joseph Lt. & Pr.	21	1.50	7.1	1.97je	D2	10.7	76
O	Tide Water Power	8	.60	7.5	.86ag	D23	9.3	70
O	Tucson Gas, E. L. & P.	24	1.60	6.7	2.26je	—	10.6	62
O	Western Lt. & Tel.	23	1.60	7.0	2.18je	4	10.5	73
	Averages			6.5%			11.4	73%
	Revenues under $5,000,000							
O	Arizona Edison	19	$1.20	6.3%	$1.45je	5%	13.1	83%
O	Bangor Hydro Elec.	27	1.60	5.9	2.23je	D14	12.1	72
O	Beverly G. & E.	46	3.40	7.4	4.13d	31	11.1	82
O	Black Hills P. & L.	19	1.28	6.7	2.14ju	6	8.9	60
O	Citizens Utilities	16	.90&Stk	5.6	2.12je	10	7.5	42
O	Colorado Central Power	17	1.00	5.9	1.39je	16	12.2	72
O	Concord Electric	36	2.40	6.7	2.65d	3	13.6	91
O	Derby G. & E.	22	1.40	6.4	2.08d	8	10.6	67
O	Eastern Kansas Utils.	15	.60	4.0	.90d	18	16.7	67
O	Fitchburg G. & E.	46	3.00	6.5	3.68d	32	12.5	82
O	Frontier Power	3	.25	8.3	.49d	20	6.1	82
O	Green Mountain Power	15	1.00	6.7	1.78je	14	8.4	56
O	Haverhill Elec.	34	3.00	8.8	3.14d	12	10.8	96
O	Lake Superior Dist. Pr.	25	1.80	7.4	2.65je	6	9.4	68
O	Lowell Elec. Lt.	45	3.55	7.9	3.96d	18	11.4	90
C	Maine Public Service	15†	1.00	6.5	1.59ju	7	9.7	63
O	Michigan Gas & Elec.	25	1.80	7.2	2.65je	24	9.5	68
O	Missouri Edison	10	.70	7.0	1.14je	9	8.8	61
C	Missouri Public Ser.	44	2.60	5.9	5.12d	16	8.6	51
O	Missouri Utilities	16	1.00	6.3	1.69je	3	9.5	59
O	Newport Electric	28	1.80	6.4	2.46ag	D19	11.4	73
O	Sierra Pacific Power	25	1.60	6.4	1.95ju	D6	12.8	82
O	Southern Colo. Pr.	10	.70	7.0	.88my	2	11.4	80
O	Southwestern El. Ser.	11	.80	7.3	1.29my	D7	8.5	62
O	Upper Peninsula Power	14	1.20	8.6	1.36je	D12	10.3	88
	Averages			6.7%			10.6	72%
	Averages, five groups			6.4%			11.7	74%
	Canadian Companies**							
C	Brazilian Trac. L. & P.	27	$2.00	7.4%	$4.69d	4%	5.8	43%
C	Gatineau Power	19	1.20	6.3	1.46d	2	13.0	82
C	Quebec Power	19	1.00	5.3	1.33d	9	14.3	75
C	Shawinigan Power	38	1.45	3.8	1.98d	39	19.2	73
C	Winnipeg Electric	38	2.40	6.3	2.44d	D4	15.6	82

d—December, 1950. my—May, 1951. je—June, 1951. ju—July, 1951. ag—August, 1951. B—Boston Exchange. C—Curb Exchange. O—Over-counter or out-of-town exchange. S—New York Stock Exchange. E—Estimated. NC—No comparable figures available. *All twelve months' earnings comparisons have been adjusted to reflect in both periods the present number of shares outstanding. If additional common shares have been recently offered, earnings are adjusted to give effect to the offering. **While these stocks are listed on the Curb, Canadian prices are used. (Curb prices are affected by exchange rates, etc.) †Does not fully reflect $7,000,000 gas rate increase effective February 18, 1951. Earnings on *average* shares outstanding $2.23; price-earnings ratio on this basis 14.8 and dividend pay-out 90 per cent. #Earnings on *average* shares outstanding $4.88, price-earnings ratio on this basis 12.1, and dividend pay-out 61 per cent.

What Others Think

Thoughts on Cheap Natural Gas

SPEAKING for himself as distinguished from the Petroleum Administration for Defense, of which he is assistant deputy administrator, C. P. Rather told the Independent Natural Gas Association of America members at their annual convention in Oklahoma City recently that gas cannot supply the entire fuel market of this country. He added that the present cheap price has a tendency to make the public "want to do exactly that."

The Southern Natural Gas Company president further stated that so long as a too cheap price is in effect, the result is that the reserves presently dedicated to pipelines are gradually depleted. And he noted that they become increasingly difficult to replace. Undedicated reserves are held for other uses or committed only for short periods. The incentive for expiration is threatened and the end result is that expansion of pipeline and distribution facilities is made more difficult. He added that partially for these reasons, and also because of the short supply of steel, natural gas is, in many instances, limited to the favored few who have it because they are dependent on it and withheld from others. He continued:

> Natural gas should be generally available on a basis nearer its real value instead of being so cheap that an unsatiable appetite results.
>
> In the long run the public will suffer.

He then observed:

> Where do the pipeliner and the distributor enter this picture? Do they expect to get rich from higher prices? No doubt they would like to but these elements of the industry are at least partially reconciled to regulation. They don't expect more than their rate of return. But they don't like the possibility of going broke while they fight through a rate case. Consequently they are reluctant to pay higher prices for gas and higher construction cost and operating expenses to expand their systems. Gradually a static situation results which can lead to only one thing and that is more rationing and regulation.

RATHER went on to say that he expected that the producer has been in full agreement with what he had said but that the producer, too, should heed a word of warning. He noted that at present the producer is not regulated. He referred to a recent decision of the Federal Power Commission (the Phillips Case) in which the commission said that it did not think that the producer was ever intended to be regulated under the Natural Gas Act as written by Congress. Rather concurred with the decision and said that the public would suffer should the producer ever come under regulation. But the PAD official pointed out that the producer increases his risk of regulation if he attempts to push gas prices beyond reasonable limits. He stated that judging by the current field prices of gas, those limits are not far off.

The pipeline president then referred to the heavy volume of rate increase requests currently pending before the Federal Power Commission. He added that when the impact of these increases hits the public, sound explanations will be required. Without explanation, Rather claimed that these rate increases can bring about very unhappy results for everyone involved, including the producer. He continued:

> The public can and will pay higher prices for gas. It has shown this by

the way it fights for gas from new pipelines having much higher rates than those of old gas systems operating in the same territory—better to have gas at higher rates than no gas at all—but it won't be gouged. There is room for the producer to get higher prices and his prices have increased to the point where a gas-producing operation is quite profitable and gives incentive to explore for more. The producer should be assured that his contracts for the sale of gas will not be interfered with. He, also, should make gas available to permit the necessary expansion of the pipeline and distribution portion of the industry so they can reasonably supply the public.

He then referred to the pipeline, distributing utilities, and the regulatory bodies as follows:

> The pipeline and distribution companies should make every effort to supply the public and should work to sell their product at its real value on a truly competitive basis.
>
> The regulatory bodies should take a realistic view of the problem, looking to the end of minimizing the risk involved in establishing new rate schedules and towards reaching a balanced fuel economy.

He continued:

> At this point let me say that, in general, I think the Federal and state bodies know this. Some sound thinking has been devoted to the future of the natural gas business as a part of the American free enterprise system. This type thinking is in the majority but whether the majority thinking prevails depends to a large extent on how the entire industry conducts itself.

Rather then pointed out that, under the law, the regulatory bodies have to give rate increases when the facts justify them just as they must decrease rates when the facts justify that action. He added that so far the regulatory commissions' job, from a standpoint of public pressure, has been easy since rates have been decreased. The speaker predicted that from now on the job would be a more difficult one and the gas industry by the way it handles its affairs and by the way it makes itself known to the public, can make that job either harder or easier and by the same token it can make its own job harder or easier. He closed on the following point:

> Let me make one final point. The public does not understand the natural gas business; other businesses do not understand it; the press knows nothing about it except what it picks up as news and, as you well know, one divorce makes more headlines than a hundred happy marriages, so the press's ears are attuned to the difficulties and mistakes of the industry and not to its accomplishments.

Rather then stated that it was his considered opinion that the natural gas industry has reached an important crossroad and it must now stop, analyze its problems with the greatest care, solve them in the light of broad public policy, and see that the answer is so presented that it is fully understood.

Natural Gas Boom

Demand for natural gas in the Appalachian and eastern seaboard area has been snowballing since the end of World War II and "we believe we have little more than touched the surface of the market," R. H. Hargrove, Texas Eastern Transmission Corporation president, told a recent luncheon meeting of the Los Angeles Society of Security Analysts.

Hargrove stated that the direction of the gas industry's future opportunity as well as its obligation is to obtain additional gas supplies, secure the required

governmental authority to expand, and then build sufficient pipeline capacity to bring these supplies to present markets.

Natural gas, however, is getting harder to buy every day, he declared. Much gas supply is controlled by oil companies, who, for one reason or another, are reluctant to sell to interstate pipeline firms. Another factor is the isolated location of some reserves.

Hargrove said there were three possible solutions to the problem of tight supply:

(1) Raise the purchase rates to entice reluctant owners to sell.

(2) Extend supply lines to tap numerous small reserves — which would probably mean higher sales prices.

(3) Pipeline companies can get into the exploration field "wholeheartedly" to find their own gas supplies.

THE pipeline company president stated that the latter possible solution is the one in which a majority of the long lines are most interested. As a result many lines have formed production subsidiaries or acquired companies already owning production. Some may engage in exploratory work directly.

The speaker noted that with the possible exception of the Pacific Northwest, the entire country is, for all practical purposes, served by natural gas. Undoubtedly this development will eventually reach that region, too, but at that time the period of territorial expansion will have been completed. Hargrove further added that even though territorial expansion is virtually over, the period of saturation is only beginning for development of the potentialities of areas presently served has scarcely begun.

Coal Gas Production

"SAFE Practices in Coal Gas Production" was the subject of an address given recently by Walter T. Deveny at the Accident Prevention Conference in Kansas City, Missouri. Deveny stressed the necessity for safety precautions both in the handling of coal and during the coking process. He declared that the gases produced by the coking process offer innumerable hazards involving fire, explosion, and asphyxiation but curiously enough are the cause of but few of the industry's accidents. Increased knowledge and development of techniques in the handling of the gases, together with extreme and almost automatic alertness on the part of all employees, all operate to reduce the dangers involved in handling gases to a minimum.

Deveny explained that great as the progress has been in combatting dangers which can be studied and avoided, he is of the belief that no such progress has been made against the problems of man-failure.

The safety expert added that he is convinced that education in safety measures is the only solution. The worker must be taught to carry his own safety department with him in his tool box and to use it under any and all circumstances in which he might find himself.

New Gas Facts

COMPOSITE income statements and balance sheets in dollars for the entire gas utility and pipeline industry for the years 1937 to 1950, inclusive, now are available in a new issue of *Gas Facts,* released recently by the American Gas Association. *Gas Facts* is the annual statistical yearbook of the gas industry, compiled and published by the AGA Bureau of Statistics.

The gas utility industry achieved several new records during 1950, and the full extent of these advances is shown in authoritative detail in this valuable

source book of information. Several improvements are contained in the 1950 edition.

All data relating to gas sales have been restated in therms, rather than cubic feet. A therm is a measure of heat content and it offers an equitable means of evaluating and comparing data relating to fuels of different heat values.

Other modifications in the contents of *Gas Facts* are the inclusion of data on sales and associated revenues to large-volume customers of utilities and pipelines, by type of industry during 1950. Certain salient statistics relating to the Canadian gas industry have been included. Copies of *Gas Facts* may be obtained from the American Gas Association Bureau of Statistics at a cost of $1.00 per copy.

Synthetic Fuel Plant Sought by Interior

SECRETARY of the Interior Oscar L. Chapman has asked approval of government aid to industry in establishing two huge plants for the manufacture of liquid fuels from coal and shale. The plants would supplement the nation's supply of fuels and relieve the pressure of increasing demands upon oil and gas deposits.

F. Eberstadt & Co. of New York announced plans early this month for construction of a $400,000,000 plant in southern Illinois if government assistance—in the form of a guaranteed minimum price for the gasoline, chemicals, and other products—was forthcoming.

The shale oil plant probably would be built in Colorado, where vast deposits of shale have been tapped on an experimental scale with promising results.

Joseph B. Doherty, acting chief of synthetic liquid fuels in the Bureau of Mines, told a reporter that Mr. Chapman had asked the Defense Production Administration to allocate "borrowing power" to him under the Defense Production Act to get the program under way. This borrowing power would be authority to draw from the Treasury money necessary to cover the interim losses of a new plant until it went into regular operation.

Mr. Doherty said the proposal would extend to the synthetic liquid fuels industry assistance similar to that already provided by the government for new plants for the manufacture of aluminum, copper, and various metals. He said Mr. Chapman planned to use the power to help establish one shale and one coal plant. If the DPA grants the request, the Department of the Interior then would prepare the detail program for specific plants and submit it to the DPA.

Mr. Doherty added that the DPA had asked for more information on the general proposal and that the Bureau of Mines was getting that information ready.

THE resignation of James Boyd as director of the Bureau of Mines, announced early this month and effective on October 15th, was said to have resulted in part from a disagreement between Mr. Chapman and Mr. Boyd over the synthetic liquid fuels program. Mr. Boyd was said to have preferred to await reports this fall on studies of comparative costs of different techniques, whereas Mr. Chapman felt that enough information already had been gathered to enable the government and industry to move ahead immediately.

¶ "PERHAPS *a financially sober public official could sweep the country today by pointing out that the way to economize is to economize."*

—M. S. RUKEYSER,
Columnist.

The March of Events

In General

Trends in Gas Financing

NATURAL gas companies, particularly those which have been engaged in expensive pipeline construction, usually have a higher percentage of debt but for a shorter term, generally twenty years, and with a complete serial or sinking-fund pay-out prior to maturity, according to Edward Hopkinson, Jr., partner of Drexel & Co.

Hopkinson told the recent meeting of the Section of Public Utility Law of the American Bar Association in New York city that natural gas preferred stocks, particularly those involving substantial construction expenditures, have usually been marketed at higher dividend rates than the electric companies, and also with sinking funds.

Hopkinson said the relatively early pay-out on natural gas debt and sinking funds on natural gas preferreds are logical on account of the "life" factor involved. Gas companies are reluctant to "prove" supplies of gas in the ground (reserves) for a period of longer than twenty years on account of property taxes on the value of "proved reserves," as well as the uncertainties of longer geological forecasting. He believed the opinion of the best geological experts is that an adequate supply of natural gas can be counted upon as available for the foreseeable future, although probably at higher prices.

Hopkinson observed that natural gas securities have also developed "a certain air of romance" as petrochemical scientific advances have indicated many fields of more valuable utilization of natural gas than as a fuel. As a result of these possible new uses for natural gas as well as the growth factor in its use as a fuel, natural gas common stocks have attained a favor with investors that causes many of the most attractive to sell on a yield basis that is lower and a times-earnings basis that is higher than many soundly capitalized and well-established electric companies. The natural gas common stocks are also favorably affected by the relatively rapid pay-off of the senior securities ahead of the common stock, resulting in the improvement of the common stock equity position.

Gas Promised for Defense Needs

WITH government defense control officials and aluminum producers jittery over the shutdown of some production as a result of the electric power curbs in the Northwest, some apparent apprehension was felt about the continuation of natural gas supply for defense industry elsewhere. Already the Appalachian area is under restrictions ordered by PAD for the connection of new space-heating and large-scale consumers of natural gas.

Late last month the government was reported to be seeking some way of assuring natural gas supplies for essential defense industry—especially in those cases where another sort of fuel cannot be used. Under the terms of the PAD order, restricting the connection of new consumers in the 15-state area, natural gas suppliers and distributors would be required to turn down large-scale demands from new consumers unless especially ordered by PAD to make connection.

The special authorization approach will probably have to be taken. But answering a series of questions raised

about the applicability of the new order, PAD officials promised that they would at least "try" to assure supplies for defense industries.

The order, PAD said, provides no relief for industrial consumers which have been refused service by natural gas sellers, but it promised to investigate any case involving essential defense production and "try to get an adequate supply for the operation" if no other fuel is available.

California

State to Pay for Utility Restoration

THE state will pay the costs of restoring light, heat, and water, in case a California city is bombed, Major General Walter M. Robertson, state civil defense director, told a statewide meeting of local civil defense officials in Sacramento last month. If a bombed area finds it necessary to call in outside utility workers to restore utility services, the area should pay the bill and then file a claim against the state, he said.

California's civil defense program was one year old on October 8th.

Connecticut

Engineer to Advise on Gas Standards

THE state public utilities commission recently announced that it had signed a contract for the services of a prominent New York consulting engineer to advise the commission in setting up standards for natural gas service.

Commission Chairman Eugene L. Loughlin said the commission had engaged the engineer to assist the commission and its staff in promulgating rules, regulations, and construction standards for natural gas pipelines within the state.

Kentucky

Gas Plant Sales Approved

SALE by the Kentucky Utilities Company of its gas plants at Paducah and Shelbyville was approved by the state public service commission last month.

The Paducah plant went to the Western Kentucky Gas Company for $822,078.90. The Shelbyville plant went to the newly organized Shelbyville Gas Company for $28,200.

The Western Kentucky Gas Company, with headquarters in Owensboro, serves that city, Bowling Green, and a dozen or more smaller communities in southwestern Kentucky.

Michigan

Commission "Streamlined"

JOHN H. McCARTHY, state public service commission chairman, has "streamlined" his state agency and stirred up some controversy. He completely revamped the old commission organization, reportedly much in the manner which will be recommended by the "Little Hoover" commission on reorganization of state government.

The streamlined structure failed to please several staff members, and now the civil service commission has objected.

McCarthy was said to be the first department head to take at face value the move to reorganize state government and cut out inefficient operating methods and deadwood.

The commission was originally composed of nine minor division heads, accountable only to the commission. They have been consolidated under four supervisors. Now heads of gas, telephone, and electric divisions report to a supervisor of utilities instead of going straight to commissioners.

Minnesota

Fare Increase Denied

THE state railroad and warehouse commission, charging company mismanagement on three counts, recently denied a Twin City Rapid Transit Company appeal for an emergency fare increase.

The company had asked to eliminate the discount in purchase of tokens at four for 55 cents, putting streetcar and bus fares on a straight 15-cent basis.

It was said to be the first time in recent commission history that an increase had been denied. One of the principal reasons was company use of its depreciation reserve fund to pay dividends to stockholders. The order also was reported to be one of the severest criticisms of company management ever written by the body.

New York

Natural Gas Pipeline Authorized

THE Federal Power Commission recently authorized the Brooklyn Union Gas Company, Brooklyn, to construct and operate approximately 3,700 feet of pipeline in Brooklyn to supply natural gas to the Williamsburg power plant of the New York city Board of Transportation.

The line, estimated to cost about $110,000, will extend from a point on the company's existing 20-inch line at or near the intersection of Penn street and Bedford avenue to the Williamsburg plant. The gas will be used in the power plant as boiler fuel for the generation of electricity.

The state public service commission intervened in the proceeding, contending that since the facilities would not be used in interstate commerce they would not be subject to FPC jurisdiction.

Ohio

FPC Affirms Order

THE Federal Power Commission last month affirmed, after a rehearing, its order of February 15, 1951, authorizing Lake Shore Pipe Line Company, of Cleveland, Ohio, to acquire, construct, and operate pipeline facilities to supply the northeastern Ohio area with natural gas.

The rehearing, which was held earlier this summer, was concerned with a 27-mile section of old pipeline between Ashtabula and Fairport, Ohio, which Lake Shore will operate as part of its system after reconstructing a part of it. The FPC's February 15th order was conditioned to require, among other things, that the old pipeline be further tested.

The commission subsequently granted requests for rehearing by Erie Gas Service Company, Inc., and Grand River Gas Transmission Company, which were competing with Lake Shore for the northeastern Ohio market.

Virginia

Interior Studies Appeal in Roanoke Case

VIRGINIA ELECTRIC & POWER COMPANY's bid to build a hydroelectric dam at Roanoke Rapids, North Carolina, was upheld on October 1st by the United States Court of Appeals for the Fourth Circuit.

Secretary of the Interior Oscar L. Chapman, who has been fighting the project, is expected to recommend that the United States Supreme Court decide whether the government or Vepco shall build the proposed $27,000,000 dam.

Chapman, who is studying the circuit court opinion, declined direct comment. However, aides to Solicitor General Philip Perlman, who must decide whether to seek a Supreme Court appeal, said his decision would depend on Chapman's recommendation.

Jack G. Holtzclaw, Vepco president, said building of the controversial dam would be held up until a final verdict is received from the courts.

"We will continue fighting the case as long as it is kept in the courts," Holtzclaw said when Chapman's expected recommendation of further court action was passed on to him. "We expected it all the time," Holtzclaw added.

The appellate tribunal at Richmond, in an opinion written by Chief Judge John J. Parker, rejected the contention by Secretary Chapman and the Virginia Rural Electrification Association that Congress reserved the multimillion-dollar project for development by the government.

Judge Parker's opinion said there was "no merit whatever" in Chapman's contention that the Federal Power Commission exceeded its authority in granting the disputed license to Vepco. This question was raised before the appellate body at a hearing on September 4th in Baltimore.

The other questions were: (1) Is either of the petitioners an aggrieved party within the meaning of the statute providing for review of the case? (2) Has Congress withdrawn the proposed development at Roanoke Rapids from the licensing power of the commission? (3) Is the commission precluded from granting the license here questioned by reason of its approval of the comprehensive plan for the development of the Roanoke river basin?

And the court said in answer: "We think that all of these questions must be answered in the negative."

Virginia Outlines Gas Curb Procedure

THE Virginia Corporation Commission, one of the state regulatory agencies to certify that it will handle its own restrictions on natural gas, has recently indicated that it will insist on proper parties and procedures in connection with enforcing natural gas service restrictions.

The commission ruled on September 24th that it lacked jurisdiction and dismissed a request of the Virginia Gas Transmission Corporation for restrictions on the use of natural gas for heating in northern Virginia. Virginia Gas petitioned the state commission asking that the restrictions be applied to the Rosslyn Gas Company, retail outlet in the Arlington-Alexandria area for gas supplied by the pipeline firm.

The state corporation commission held, however, that Virginia Gas was engaged entirely in interstate commerce, and that the commission could not do anything to it or for it.

Commissioner H. Lester Hooker noted the petition should have come from the retail company. Counsel for Rosslyn Gas indicated the retailer would ask for the restrictions at a later date.

The state commission has turned down a similar request by the Virginia Gas Distribution Corporation, another Virginia Gas Transmission Corporation outlet serving a number of cities and towns in the valley of Virginia.

Progress of Regulation

Bond Issue Approved Despite Increase in Debt Ratio

THE Colorado commission authorized a gas company to issue first mortgage bonds, debentures, preferred stock, and common stock dividends to defray the cost of acquiring another gas system, to reduce an outstanding bank loan, and to provide for the cost of construction of a distribution system. The purpose of the stock dividend was to establish the amount of outstanding common stock at a figure more in line with the other items on the company's balance sheet.

The proposed financing would result in an increase in the company's bonded indebtedness from 52.35 per cent to 60.74 per cent of total capital structure. The commission, although observing that the debt ratio seemed to be high in accordance with established principles of sound public utility financing as previously required, did not believe that under the circumstances of this case it was too high.

The company's gross income was ample to service the income deductions, and, consequently, the increase in debt ratio would not carry a threat to the financial integrity of the company. The commission recognized the tax savings applicable to a bond issue since annual interest requirements are an allowable deduction in computing taxable income. It pointed out that such savings, which would not be available if the company issued additional common or preferred stock, directly affect the earnings of the company and the burden its customers have to bear in rates for service.

Furthermore, the company's financial structure would be strengthened by the sinking-fund and retirement provisions in the bonds and debentures. The bonds are subject to a sinking-fund provision providing for a scheduled redemption out of earnings. Thus the debt ratio of the company will automatically be improved each year. Another factor considered was the fact that the area served by the company is comprised largely of domestic users. Consequently, earnings are likely to be less affected by a recession than if the company were serving a highly industrialized area.

The commission also exempted the proposed issue from competitive bidding requirements although recognizing the desirability of competitive bidding generally. It found that the price offered and the yields contemplated were favorable. Furthermore, it pointed out that market conditions are not stable and that the delay which would result if the bonds were to be sold by competitive bidding might result in considerably lower prices than those being offered. *Re Greeley Gas Co. Application No. 11229-Securities, Decision No. 37033, July 3, 1951.*

Gas Company Permitted to Retain Reparation Fund

A NATURAL gas company was directed by the Missouri commission to retain for its own use a $9,000 refund which it had received as a result of the Federal circuit court decision in Interstate Nat. Gas Co. *v.* Federal Power Commission (1950) 181 F2d 833, 84 PUR NS 33. The money represented the company's

share of reparations which were ordered by the Federal court after it had determined that an interstate gas company had collected excess charges.

The commission accepted the company's estimate that the cost of distributing the $9,000 would be about $6,500 if all present and former customers were included and $4,300 if only present customers were included.

This cost-of-distribution factor, when considered with the fact that no one opposed the company's retention of the fund, apparently affected the commission's decision.

The commission observed that even if the company were allowed to keep the fund, its earnings would not be excessive and indicated that at some future time it would take into consideration its action in this case with more substantial resulting benefits to the consumers. *Re Missouri Nat. Gas Co. Case No. 12,103, July 20, 1951.*

Interruptible Natural Gas Service Rate Approved

THE Michigan commission, in approving an interruptible service rate for the sale of natural gas, found that the inclusion of a specific stand-by requirement was not necessary. Some of the company's prospective customers who had indicated an ability and willingness to take natural gas at the proposed interruptible service rate had stand-by facilities to use in case of interruption or curtailment of service. Other prospective customers who did not need continuous use of fuel for the requirements of their business did not feel justified in investing in stand-by facilities. The type of business operated by these customers would not greatly suffer from supply interruption.

The commission said that although it would not require the inclusion of the specific stand-by requirement, it should be distinctly understood and represented by the company that service under this rate was definitely interruptible or curtailable as found necessary by the company and that no rights to firm gas service should be acquired by virtue of service under the interruptible rate. Under these conditions the commission found that the proposed interruptible service rate was in the public interest and should be approved. *Re Southeastern Michigan Gas Co. D-3770-51.4, June 15, 1951.*

Gas Company Entitled to 7½ Per Cent Return

A GAS company serving Miami Beach may charge rates yielding a return of 7½ per cent on "actual cost" less "accrued depreciation," according to a ruling of a Florida circuit court. Rates prescribed by ordinance were held to be confiscatory and to deprive the company of its property without due process of law, since they would yield a return of only about 6 per cent.

In so ruling the court reversed in part and affirmed in part a special master's report. This report was deemed proper when made, but the legislature had made a new declaration of public policy when it delegated rate regulatory authority over gas and electric utilities to the commission.

The statute empowered the commission to determine actual legitimate costs of utility property honestly and prudently invested, less accrued depreciation.

The court also noted that after the filing of the report the supreme court of Florida announced a standard of valuation other than that used by the master. In Jacksonville Gas Corp. *v.* Railroad & Public Utilities Commission (1951) 88 PUR NS 420, 50 So2d 887, the court stated that the rate-making body might select either the "actual cost" plan or "present fair value" plan and derive a rate that the court could not condemn. In that case the use of accrued depreciation was inferentially approved by the supreme court. Consequently, this remains

an important factor which must be considered in a rate case.

The circuit court concluded that the property valuation factor of the rate base is "original cost depreciated," which was in this case equivalent to "actual cost" less "accrued depreciation."

General economic conditions, the necessity and ability of the utility to attract capital, the current cost of money, the risk involved, comparisons with other enterprises of a similar nature, and the efficiency of management were considered essential factors entering into the determination of a fair and reasonable rate of return. The court recognized that general economic conditions are at a high level and that the cost of doing business and cost of living have increased sharply in the post World War II period. It also noted that public utility rates throughout the United States have been increased by official and judicial action in nearly every forum of the country.

The gas company is in a vulnerable position from the standpoint of the general character of the population it serves, being largely dependent on the winter visitor business and subject to weather conditions. It was pointed out that the extent to which visitors come to the area and the volume of gas sales are dependent largely on the economic conditions over the country. A warm winter season makes great inroads into the company's earnings. The conditions contribute to the company's poor load factor of 25 per cent of capacity and places its operation in a higher risk category than other gas utility companies.

In the Jacksonville Case the commission had fixed a return of 7 per cent. The court pointed out that by comparison with the Miami Beach area, Jacksonville is a staid, stable, substantial community where business conditions remain on a constant level throughout the year and are not subject to the same degree of fluctuation or variation as the Miami Beach area. It was concluded that the company serving the Miami Beach area was in a high public utility investment risk category and was, consequently, entitled to a return of at least $7\frac{1}{2}$ per cent. The company's existing rates were approved because they most nearly provided such a return. *Peoples Water & Gas Co. v. Miami Beach, No. 118302, June 21, 1951.*

Individual May Transfer Gas Franchise without Approval

An individual who is not rendering public utility service need not obtain commission consent to transfer to a public utility a municipal franchise held by him, according to the Missouri commission. The individual was not engaged in any type of utility business in his individual capacity. He was, however, president of the gas company. The commission observed that not only was its consent to the transfer unnecessary but, in fact, it was without jurisdiction in the matter.

The governing statute provides that no gas corporation shall transfer its franchise without commission authority. The term "gas corporation," as used in the statute, includes corporations or persons owning, operating, controlling, or managing any gas plant operating for public use under privilege, license, or franchise.

The commission observed that in this case the individual held nothing but a naked franchise. He owned no operating properties, nor did he in any way conduct a gas utility business. It concluded that he did not come within the definition of a gas corporation as set forth in the statute. Consequently, he might transfer his franchise as he saw fit.

Furthermore, the commission held, the licensed gas company could acquire the franchise and operate its utility business under that instrument without the approval and consent of the commission. The utility had authority to serve the area covered by the franchise. Any franchise obtained subsequent to the issuance of a certificate from newly constituted pub-

lic bodies located in the service area of the utility, and assigned to that utility, should be treated as a new, or renewal, franchise supporting an active certificate of convenience and necessity. It would not be necessary to submit this to the commission for its approval. The method by which the franchise was acquired by the operating gas company was of no concern to the commission, particularly since no question was raised as to the validity of the franchise or its proposed transfer. *Re Bell et al. Case No. 12,174, September 5, 1951.*

Restoration of Telephone Service to Alleged Gambler Matter for Equity Rather Than Law Court

JUDGE Vincent C. Giblin of the Florida Circuit Court dismissed a proceeding at law to compel a telephone company to restore service denied to a subscriber allegedly using telephone facilities for gambling purposes. However, the dismissal was without prejudice to the subscriber's right to seek relief in equity. He ruled that when an appeal is made for such relief, it should be by bill in equity, since, in his opinion, mandamus on the law side is not the proper remedy.

Because of recently enacted legislation, the use of telephone facilities for gambling purposes, or in furtherance of gambling, is a criminal offense in Florida. Judge Giblin observed that much, if not most, of what was said in this opinion might be *obiter dicta,* but his purpose was not only to explain the action taken by the court, but also to express his interpretation of applicable and governing law for the guidance of litigants and counsel in future cases of a similar nature. He expressed the hope that his fellow judges who might not yet have had the opportunity or occasion to study and decide the important questions under the statute might concur in his views so that there would not be conflicting decisions in future cases.

Under the statute, an offending criminal is not entitled to the aid of a court of equity to prevent the discontinuance or to effect a restoration of telephone service which he has employed to further his illegal gambling activities. The statute also provides that any person aggrieved by the action of the utility should be entitled to present the matter to the commission for its review and determination. If, after consideration, it is determined that the subscriber is entitled to telephone service and that it will not be used for unlawful purposes, the commission may authorize the utility to provide such service. The court said that there is no constitutional impediment to the legislature's delegating this power to the commission, rather than to the courts.

It was conceded that conditions may arise in which one whose service is about to be, or has been, discontinued, may be entitled to temporary injunctive relief pending a commission hearing. The court said that if equities are shown to be involved, a court of equity has jurisdiction to act by appropriate injunctive order to prevent a discontinuance or to require a restoration of service until such time as the affected person shall have been accorded a commission hearing.

In holding that such relief should be by a bill in equity rather than by mandamus on the law side, the court said that the chancellor should act cautiously and with the utmost discretion. It should be presumed that the law enforcement officer by whom the telephone company has been notified of illegal use of its facilities has not violated his oath of office and abused the drastic power vested in him. On the other hand, it was said, the court should be appreciative of the fallibility of law enforcement officers and their understandable tendency to rely on circumstances as supporting their suspicion of guilt even though the circumstances may be entirely consistent with innocence.

The injunctive relief, in the exceptional case where it shall be granted because of the impelling equities involved, should be such as the exigencies of the matter require to afford a temporary safeguard

only until such time as the commission shall have heard and determined the matter.

The court should not undertake to exercise the jurisdiction vested in the commission. In fact, the court held, the relief should not be granted unless the aggrieved party shall have applied to the commission for a hearing or unless he shows a valid excuse for not having done so and states under oath his intention to do so without delay. *Gardner v. Southern Bell Teleph. & Teleg. Co. Case No. 25636-I, August 7, 1951.*

Local Carriers Need Certificate to Interchange Shipments for Joint Hauls

THE superior court of Pennsylvania reversed a commission order which permitted two local motor carriers to interchange shipments and establish joint haul practices without any proceeding to determine the public necessity for the interchange and the resulting new service. It held that the commission must hold a hearing, receive evidence, and pass upon the question of public necessity where additional rights are granted a carrier or group of carriers. The interchange or the establishment of joint routes put into effect by the motor carriers in this case was held to involve the exercise of an additional right by those carriers.

The court observed that the privilege of interchange allows a carrier to accept freight originating at points included in its certificate and destined for delivery beyond its authorized territory and to carry it to an interchange station to be transferred to another carrier delivering the freight to the destination in the territory embraced in the latter's certificate. It was pointed out that both courts and commissions have consistently held that specific commission approval is necessary for such interchange service. The full right of interchange or the establishment of through routes between carriers certificated in different areas was held to constitute a distinct rendition of public service requiring specific commission approval in the form of a certificate of public convenience and necessity.

The commission believed that its own rules and regulations allow such an interchange without a hearing or determination of public need for the service. The court concluded, however, that if the rules were considered in their entirety, it would be possible to give them an interpretation consistent with the law requiring specific commission approval of such interchange rights as were claimed by the motor carriers.

The construction of such rules and regulations, as well as the rules and regulations themselves, must be consistent with the law, according to the court. It said that the power of the commission to prescribe rules and regulations under a statute is not the power to make law, but only the power to adopt regulations to carry into effect the will of the legislature as expressed by statute. *Lancaster Transp. Co. et al. v. Public Utility Commission et al. 82 A2d 291.*

Service Failure Basis for Revocation of Operating Authority

THE supreme court of Nebraska upheld a commission order canceling a motor carrier's authority to serve intermediate points between specified terminals for willful cessation of regular scheduled service to those points without obtaining commission approval. The carrier had not conducted regular operations over the route involved because freight tonnage had dropped off.

During the past six months, it had performed little or no service to only a few of the many intermediate points between the terminals involved, and none to them upon any regular basis. Furthermore, the carrier had not been available

to perform adequate regular service.

It was conceded that the carrier had at no time applied to the commission for authority to discontinue or abandon his regular route operating rights in whole or in part, and had not advised the commission of the fact that he was not continuing all operations over all of the highways over which he held authority. He had not provided all of the services required by his certificate, although he knew that such approval was required.

At the outset, the court held that the commission has jurisdiction and authority to suspend, change, or revoke a certificate of convenience and necessity in whole or in part if it does so in conformity with governing statutes. The commission has statutory authority to revoke a certificate for willful violation of the provisions of the governing statute or any reasonable order, rule, or regulation promulgated under that statute. The carrier raised the question whether or not it had been guilty of any such willful violation. The court observed that the word "willful" often denotes an act which is voluntarily, knowingly, or permissively done as distinguished from one which is accidental or otherwise beyond the control of the person to be charged.

The general notion that a willful act implies a bad purpose is derived from criminal statutes. It has no such meaning when used in a statute to denounce an act not in itself wrong. The court concluded that willful failure, as used in the statute, was such behavior through acts of commission or omission justifying a belief that there was an intent entering into and characterizing the failure complained of.

The court finally said that there was sufficient evidence to sustain a finding that a willful failure to comply with an order of the commission had occurred and that the order based on that finding was not unreasonable or arbitrary. It may not interfere with commission orders unless they are shown to be unreasonable or arbitrary. *State Railway Commission v. Resler et al. 48 NW2d 718.*

Other Important Rulings

THE Massachusetts Department of Public Utilities approved the issue of 10-year sinking-fund notes to finance a gas company's conversion of customers' appliances and exempted the issue from competitive bidding requirements where the issue was to provide for nonrecurring operating expenses to be amortized over a 10-year period and did not in any sense represent permanent capitalization, where the cost of the requirement of competitive bidding would be disproportionate to the size of the issue, and where the company had made a sincere effort to secure money at the lowest possible cost. *Re Springfield Gas Light Co. DPU 9584, July 30, 1951.*

The Massachusetts Department of Public Utilities, in authorizing a gas company to issue securities to pay notes or other indebtedness incurred for the construction of additions to its plant, said that normal construction expenditures should be financed with short-term borrowings, depreciation, or surplus funds and that permanent financing should await installation of the additions. *Re Lowell Gas Co. DPU 9383, August 1, 1951.*

The Colorado commission, in granting natural gas certificates, held that the fact that such authorization might curtail the sale and movement of coal by railroads in the state was immaterial, since the commission has no power to prohibit what would otherwise be sound and reasonable action merely because it might injure another industry. *Re Natural Gas Producers, Inc. Application No. 11228, Decision No. 37200, August 8, 1951.*

The Louisiana commission held that a fair and equitable return for an independent telephone company is 6 per cent. *Ex Parte Breaux Bridge Teleph. Co. No. 5717, Order No. 5766, June 18, 1951.*

The Colorado commission, in denying a rate increase for motor carriers transporting household goods, held that truck-mile costs and truck-mile earnings are important factors to be considered, and although the commission may easily determine truck-mile revenue, the carrier has the burden of presenting truck-mile costs in such a proceeding. *Re Rules and Rates for Household Goods by Motor Carriers, Investigation and Suspension Docket No. 327, Decision No. 37187, August 3, 1951.*

The Indiana commission, in denying authority to substitute a prepaid for an agency station, held that a railroad company operating through a community and enjoying the rights of eminent domain in securing its right of way should be more responsible to the community than a concern engaged in a private line of business and should keep this factor in mind in requesting discontinuance of agency stations which are not quite as profitable as others. *Re New York, C. & St. L. R. Co. No. 22077, August 16, 1951.*

The Pennsylvania commission held that a motor carrier applicant for excursion and sight-seeing rights need not establish that existing carriers are unable to furnish the service proposed; and the fact that existing carriers have sufficient equipment to render the same service in the territory does not necessarily require the refusal of an application. *Re Schuylkill Valley Lines, Inc. Application Docket 24663, F. 6, Am-B, June 25, 1951.*

A proposed transit rate increase yielding a return of 4.21 per cent on a depreciated original cost rate base was authorized by the Pennsylvania commission which believed that such a return was not unreasonable. *Shenandoah v. Schuylkill Transit Co. Complaint Docket No. 15131, July 30, 1951.*

Titles and Index

Preprints in This Issue of Cases to Appear in
PUBLIC UTILITIES REPORTS

Titles

Index

Public Utilities Reports (New Series) are published in five bound volumes annually, with an Annual Digest. These Reports contain the cases preprinted in the issues of PUBLIC UTILITIES FORTNIGHTLY, as well as additional cases and digests of cases. The volumes are $7.50 each; the Annual Digest $6.00. *Public Utilities Reports* also will subsequently contain in full or abstract form cases referred to in the foregoing pages of "Progress of Regulation."

Re Springfield Gas Light Company

D.P.U. 9584
July 30, 1951

APPLICATION *by gas company for approval of the issue of 10-year sinking-fund notes and for exemption from competitive bidding with respect to the issue; approval and exemption granted.*

Security issues, § 112 — Exemption from competitive bidding — Financing of nonrecurring expenses.

A gas company was granted an exemption from competitive bidding requirements with respect to the issuance of 10-year sinking-fund notes to finance the conversion of customers' appliances, since the issue was to provide for nonrecurring operating expenses which were to be amortized over a 10-year period and did not in any sense represent permanent capitalization, where the cost of competitive bidding would be disproportionate to the size of the issue and the company had made a sincere effort to secure the money at the lowest possible cost.

APPEARANCE: Hervey W. King, for the petitioner.

By the DEPARTMENT: Springfield Gas Light Company, on June 14, 1951, filed with the Department an application in accordance with the provisions of § 14 of Chap 164 of the General Laws, as amended, for approval of the issue of a maximum amount of $1,250,000 face value of $3\frac{3}{8}$ per cent notes to be dated September 1, 1951, and, unless previously prepaid in whole or in part in accordance with their terms, to mature December 1, 1961. The proceeds of the issue are to be used for the purpose of defraying the cost of converting customers' appliances, including the payment of all or part of the current debt incurred for that purpose, said expenditure being required to enable the company to serve its customers with gas of 1,000 BTU content. A certified copy of the vote of the board of directors of the company authorizing the issue of notes has been filed with the Department.

A public hearing was held by the Department on July 18, 1951. At the hearing the company filed exhibits relating to its financial condition and entered testimony thereon.

The notes are to be dated September 1, 1951, and are to carry interest at a rate of $3\frac{3}{8}$ per cent per annum. In order to provide the funds required for conversion purposes $700,000 face value of said notes will be issued on or about September 5, 1951, and the balance or such portion of said balance (if any) as may be determined by the company will be issued prior to

December 31, 1951. Under the provisions of the notes the company agrees to pay at par on December 1st, in each of the years, 1952 to 1960 inclusive, 10 per cent of the aggregate principal amount of the notes ultimately issued and the company has the option to pay at par on December 1st, in each of said years up to but not more than an additional 10 per cent of the aggregate principal amount of the notes issued. All notes, or any part or parts thereof, taken in multiples of $1,000 at any time outstanding may be called for redemption and payment at any time on thirty days' prior notice at the redemption price of 102 per cent on or before December 1, 1952, and at a progressively lower redemption price annually to a price at the face amount after December 1, 1960.

The petition of the company sets forth and evidence was presented that the notes are to be issued at par plus accrued interest from September 1, 1951, and sold and delivered at private sale, without public offering, to a single institution for its own account for investment and with no present intention of distributing or reselling the same.

In its petition the company requests the granting of an exemption from all of the requirements of § 15 of Chap 164 of the General Laws, as amended, with respect to the issuance of $1,250,000 of notes and if such request be not granted by the Department it requests approval of $1,000,000 of said notes. Said § 15, as amended, requires competitive bidding on issues of notes for periods exceeding five years and for amounts exceeding $1,000,000 unless exemption is granted by the Department if it finds the exemption in the public interest.

The Department is of the opinion that it would be in the public interest to grant such exemption particularly because the issue is to provide for nonrecurring operating expenses which are to be amortized over a 10-year period and do not in any sense represent permanent capitalization. It appears from the evidence that the cost of the requirement of competitive bidding would be disproportionate to the size of the issue and that the company has made a sincere effort to secure the money at the lowest possible cost.

MICHIGAN PUBLIC SERVICE COMMISSION

Re Michigan Consolidated Gas Company

D-3430-51.1
May 28, 1951

COMPLAINT *against gas company refusing to furnish gas for space heating to new multiple apartment buildings during shortage of supply; complaint dismissed. For related case, see post, p. 40.*

Discrimination, § 239 — Decision upon motion to dismiss.

1. The question whether a utility is guilty of unlawful discrimination should not be decided upon a motion to dismiss a complaint against a refusal to supply gas service, p. 38.

Service, § 146 — Gas for space heating — Restrictions during emergency.

2. An order authorizing a gas company to place restrictions upon service for space-heating purposes during a shortage of supply, but allowing the company, in its discretion, to furnish space-heating service to new dwelling units which would use less than a specified amount of gas, was intended to make new multiple apartment buildings ineligible for space heating, p. 38.

Service, § 146 — Gas for space heating — Curtailment during emergency — Factors considered.

3. The Commission, in passing upon a gas company's duty to furnish space-heating service to new customers during a shortage of supply, must give first consideration to protection of available gas for existing users who are already dependent on such gas for the heating of their homes, p. 38.

Discrimination, § 205 — Gas for space heating — Preferences during shortage of supply.

4. A gas company, authorized to place restrictions on service for space-heating purposes during a shortage of supply, but allowed in its discretion to furnish space-heating service to new dwelling units which would use less than a specified amount of gas, was not guilty of unlawful discrimination in refusing to furnish such service to new multiple apartment buildings while furnishing the service to single family residences, since the term "new dwelling units," as used in the curtailment order, was intended to make new multiple apartment buildings ineligible for space heating, p. 38.

By the COMMISSION: Harry F. Stiles, Frederick E. Stiles, and Merton Stiles, a co-partnership doing business as Stiles and Company (hereinafter referred to as Stiles) filed their petition for an investigation of the administration of our Order D-3430-50.3 by Michigan Consolidated Gas Company. We treated the petition as a complaint and

under our rules served a copy thereof upon the utility in question. Michigan Consolidated Gas Company (hereinafter referred to as Consolidated) filed its answer and the matter was set down for hearing before the Commission and its officers in the city of Lansing on May 7, 1951. The question raised by the complaint and answer and at the hearing was whether Consolidated unlawfully discriminated against Stiles by rejecting a certain application made by Stiles for gas space-heating purposes. The matter is governed by our Order No. D–3430–50.3 of May 22, 1950.

The co-partners of Stiles Company are principally engaged, under the corporate name of Stiles Incorporated, in the sale of lumber to builders in the city of Grand Rapids. Stiles Company, the co-partnership, owns 16 lots, approximately 50 x 150 feet, in a triangle of land in the city of Grand Rapids. It has under construction on said lots 16 2-story brick veneer buildings designed to provide living units for four families in each building, two to each floor. The buildings have a common basement, a common entrance, and are what is commonly described as 4-family apartments. They are being constructed primarily as an investment for members of the Stiles family who will own them and rent them to the public.

Construction of the buildings was in charge of Allen Knapp, a building contractor, who had been engaged in construction work in and about Grand Rapids since January, 1948. Plans were completed in the latter part of November, 1950, and on December 12, 1950, Knapp made application to Consolidated to receive gas for space-heating purposes in said buildings. The application was rejected on that day, on the ground that Consolidated was not serving any multiple buildings, nothing but individual family dwellings (R 110). Prior to the instant application, all applications to Consolidated submitted by Knapp had been for single family homes. Actual construction of the buildings here under consideration did not begin until the second week of January, 1951.

Consolidated discontinued all new space-heating applications, due to inadequate supply, as of April 7, 1951. It was accepting applications for gas for space-heating purposes in "new dwelling units where the input rating of all space-heating equipment installed or to be installed does not exceed the rate of 250 cubic feet of gas per hour" however, on the date of Stiles' application.

The issue raised is whether under our order D–3430–50.3 Consolidated was required to accept Stiles' application for gas space heating in the buildings under construction, and whether Consolidated's refusal to accept said application amount to unlawful discrimination.

Gas has been in short supply on Consolidated's distribution system in the Grand Rapids area for a considerable period of time. Restrictions were first placed on the acceptance of new gas space-heating customers by an order of the War Production Board, Utilities Division, issued in 1942 applying generally throughout the Michigan area. When this restriction was removed in June, 1945, it soon became obvious that the demand for gas for new space heating exceeded the

available supply. A survey made during the month of July, 1945, of all available sources of gas supply for the western districts of Consolidated (which included Grand Rapids) showed that the supply of gas available during peak periods would not be adequate to meet the demands of existing customers and prospective space-heating consumers. This was substantiated by actual gas requirement volumes for the year 1945 which showed that domestic space-heating gas consumption in the Grand Rapids district amounted to 1,940,000,000 cubic feet compared with 1,444,000,000 cubic feet in 1941, an increase of 500,000,000 cubic feet or 34.6 per cent.

Accompanying this increase in demand was an ever-diminishing supply of natural gas in Michigan.

Accordingly, this Commission in its Orders D–1649, D–1350, D–2934, issued on September 13, 1946, found that an emergency situation had arisen on or before August 1, 1945, with respect to the distribution of sale of natural gas by Michigan Consolidated Gas Company in the Grand Rapids area and that in order to adequately supply the customers of Consolidated already connected to its lines, it was in the public interest to suspend the acceptance of space-heating applications. This suspension remained in effect until July 29, 1949, at which time we found that through the completion of the facilities of the Michigan-Wisconsin Pipe Line Company a new supply of natural gas had been made available to Consolidated, and we permitted the restrictions to be discontinued.

Between July 29, 1949, and May 22, 1950, the demand for natural gas by new space-heating customers greatly exceeded the estimates made at the time we permitted the restrictions to be lifted and outran the increase in the supply of gas made available through the construction of the pipeline. It had been estimated that about 45,000 new space-heating customers would be connected in this period, whereas, over 131,000 were connected and approximately 164,000 new applications were received. In order to protect existing customers, this Commission once more entered its order providing for the restriction on the acceptance of new gas space-heating applications by Consolidated. This order, entered May 22, 1950, D–3430–50.3, found that an emergency situation had arisen throughout the whole distribution system of Consolidated and that the unrestricted acceptance of new space-heating applications would jeopardize existing customers and provided as follows:

"Therefore, it is *ordered:*

"1. That Michigan Consolidated Gas Company is hereby granted permission to restrict its service in its Detroit, Grand Rapids, Muskegon, Ann Arbor, Greenville-Belding, and Big Rapids districts for space-heating purposes to the needs and requirements of space-heating customers connected to the company's service lines on or before May 22, 1950, and to customers whose applications for space-heating service have been approved by the company prior to the close of business on May 22, 1950; provided, however, that in the discretion of the company the foregoing restriction shall not apply to new dwelling units where the input rating of all space-heating equip-

ment installed or to be installed does not exceed the rate of 250 cubic feet of gas per hour and such new dwellings shall consist either of new construction which has not prior to May 23, 1950, been used or occupied as a dwelling or dwellings, the construction of which is completed on or after May 23, 1950."

It is the proviso of this order, which is relied upon by both parties to this proceeding.

[1] Stiles argues that inasmuch as it has proven that its buildings will consume less than a maximum of 250 cubic feet of gas per hour in all space-heating equipment in said buildings, that it automatically becomes entitled to have its gas heating applications for said buildings accepted by Consolidated and that any other interpretation renders the order invalid. Consolidated claims that the term "new dwelling units" has the plain legal meaning of single family residences and that inasmuch as the evidence clearly shows that Stiles is constructing buildings which will house four families, it is entitled to have the complaint dismissed as a matter of law. We have proceeded with an examination of the facts because we held that where discrimination by a public utility is charged, the matter ought not to be decided upon a motion to dismiss. Accordingly, Consolidated's motion to dismiss is hereby denied.

[2-4] The question of the applicability of the instant order to multiple dwellings has been before the Commission informally. On December 4, 1950, representatives of the Lincoln Construction Company, referred to in our order and opinion of even date in the Prudential Investment Company complaint, conferred with the Commission on the meaning of said order. On December 7, 1950, the Commission directed its Secretary to inform Lincoln Construction Company as follows:

"The Commission after due deliberation has instructed me to advise you that their interpretation of the meaning of the proviso relating to 'new dwelling units' was intended to make ineligible for gas space heating row type multiple apartment buildings such as the type you are now constructing and for which you seek gas service."

Stiles was advised of this interpretation on December 12, 1950, four weeks before they started construction of their buildings (R 110).

We adhere to our previous interpretation of the proviso "new dwelling units" that it was intended to make ineligible for gas space-heating multiple apartment buildings.

We pass the question of what Consolidated's duty to Stiles would be if Consolidated had an abundant volume of gas for distribution since the evidence is very clear that demand has outrun supply throughout Consolidated's system. In such circumstances, we consider it our duty to give first consideration to the protection of available gas for existing users who are already dependent on such gas for the heating of their homes. Curtailment is for the purpose of insuring that, so far as possible, existing users will not find themselves without sufficient gas for home heating in zero degree days with the consequent injury to public health, safety and welfare.

Accordingly, Order D-3430-50.3 must be construed in the light of its avowed purpose, which was to permit

abandonment of unlimited service to new applicants with the proviso that "new dwelling units" expected to be relatively small in size and not to be constructed faster than increased facilities would increase the supply of gas, might be accepted at Consolidated's discretion.

The 250 cubic foot per hour measure was not considered as an expansion of the meaning of the term "new dwelling units" but was an additional limitation designed to avoid ingenious attempts to evade the effect of our order through the use of unusual construction techniques. The average single residence uses a maximum of approximately 85 cubic feet of gas per hour for space heating, whereas Stiles makes its legal argument in terms of a use of 250 cubic feet per hour for a single family residence.

There is no evidence that the average new single home uses 250 cubic feet per hour. Rather, an expert witness for Stiles testified that a single home 24 x 32 could be heated with 70 cubic feet per hour and a larger home with a maximum of 85 cubic feet per hour, while the Stiles units would use 240 cubic feet per hour. It is apparent that a block of such single homes in Grand Rapids on 50-foot lots would use less gas than a comparable block of these 4-family apartments on 50-foot lots. The 16 apartment buildings as constructed by Stiles would use 16 times 240 cubic feet or 3,840 cubic feet per hour, whereas, 16 average single homes would use 16 times 85 cubic feet per hour or 1,360 cubic feet of gas per hour, or about $\frac{1}{3}$ as much. Under such circumstances we cannot say that the action of Consolidated in refusing the application for new space heating becomes discriminatory merely because the buildings constructed by Stiles and Company use less than 250 cubic feet of gas per hour for space-heating purposes. We, therefore, find that our Order D–3430–50.3 was intended to make ineligible for gas space-heating multiple dwellings such as those constructed by Stiles and Company and that the refusal of Consolidated to accept the application for service of said buildings was not discriminatory.

We further find that said Order D–3430–50.3 does not delegate unlimited discretion to Consolidated but is subject to our continual over-all supervision and examination, herein exercised, to avoid discriminatory administration.

It is therefore *ordered* that the complaint of Stiles and Company be and hereby is dismissed.

Leslie R. Schmier et al. Doing Business As Prudential Investment Company *v.* Michigan Consolidated Gas Company

D-3430-51.2
May 28, 1951

COMPLAINT *against gas company refusing to furnish space-heating service to new multiple dwelling units during shortage of supply; complaint dismissed. For related case, see ante, p. 35.*

Service, § 146 — Gas for space heating — Restrictions during shortage of supply.

1. The physical characteristics of a building rather than the legal incidence of title govern the application of an order authorizing a gas company to restrict space-heating service during a shortage of supply but allowing the company, in its discretion, to serve new dwelling units having an input rating of less than 250 cubic feet of gas per hour, p. 43.

Discrimination, § 205 — Gas for space heating — Preferences during shortage of supply.

2. A gas company, authorized to restrict space-heating service but allowed to serve new dwelling units which would use less than a specified amount of gas during a shortage of supply, properly refused to serve buildings providing under one roof separate and distinct living quarters for two families divided by a party wall, with each side of the building standing upon a separate lot and with the resident of each side having legal title to that half of the building in which he lived, although the company was serving new individual family dwellings, since the term "new dwelling unit" in the order meant a residence of a single family rather than two homes under one roof or a double house, p. 43.

By the COMMISSION: Leslie R. Schmier, Regene Schmier, Barney Katzman, Jeanette Katzman, Sidney Katzman, and Betty Katzman, copartners, d/b/a Prudential Investment Company (hereinafter referred to as Prudential) filed their complaint with this Commission against the Michigan Consolidated Gas Company, a Michigan corporation, alleging that they were being unlawfully refused gas for space-heating purposes. In accordance with our rules, a copy of the complaint was served upon the Michigan Consolidated Gas Company (hereinafter referred to as Consolidated), and the same being unsatisfied by answer, the matter was set down for hearing on Monday, May 7, 1951, at the Commission offices in Lansing, Michigan.

Prudential is engaged in building homes for resale in the city of Detroit. Consolidated is a public utility furnishing gas in the city of Detroit, pursuant to our regulation. On February 16, 1951, Prudential made written application to Consolidated for the issuance of gas space-heating applications on a certain construction project which will hereinafter be discussed in detail. The applications were rejected by Consolidated February 28, 1951, on the ground that the buildings, as constructed by Prudential, would be duplexes and not single dwellings. In their complaint and at the hearing, Prudential argued that the buildings, as constructed, automatically entitled them to gas for space heating in accordance with our Order D–3430–50.3, and that if such was not the fact, said order amounted to an unconstitutional delegation of discretion to Consolidated. Consolidated argued that the order plainly disqualified Prudential as an applicant for gas space heating and made a motion to dismiss the complaint. In our opinion neither contention quite meets the issue here involved and the motion to dismiss is denied.

Order D–3430–50.3 was adopted May 22, 1950, and the pertinent provisions are as follows:

"Therefore, it is *ordered:*

"1. That Michigan Consolidated Gas Company is hereby granted permission to restrict its service in its Detroit, Grand Rapids, Muskegon, Ann Arbor, Greenville-Belding, and Big Rapids districts for space-heating purposes to the needs and requirements of space-heating customers connected to the company's service lines on or before May 22, 1950, and to customers whose applications for space-heating service have been approved by the company prior to the close of business on May 22, 1950; provided, however, that in the discretion of the company the foregoing restrictions shall not apply to new dwelling units where the input rating of all space-heating equipment installed or to be installed does not exceed the rate of 250 cubic feet of gas per hour and such new dwellings shall consist either of new construction which has not prior to May 23, 1950, been used or occupied as a dwelling or dwellings, the construction of which is completed on or after May 23, 1950."

Since the introduction of natural gas into the Consolidated's distribution system in Detroit in 1936, there has been a continually expanding demand for such gas to be used for gas space-heating purposes.

In 1942, the War Production Board, Utilities Divisions, placed restrictions on the sale of natural gas for new space-heating customers generally throughout the United States including the Michigan area. When this restriction was removed in June of 1945, it soon became apparent that there was a considerably expanded market for the sale of gas for space heating in Detroit. In August, 1946, an order was placed in effect, which continued until July 29, 1949, restricting Consolidated from accepting new space-heating customers. On that latter date this Commission found that the facilities of the Michigan-Wisconsin Pipe Line Company, an affiliate of Consolidated, would be completed in time to provide a new source of natural gas for the winter of 1949–1950. Accordingly, we acted at that time in

order to insure that prospective users would receive the benefits of gas for space heating in the forthcoming winter season. The instant order was entered May 22, 1950, and permitted the curtailment of service to new gas space-heating applicants under the terms above recited.

When on July 29, 1949, this Commission permitted the removal of restrictions on gas space heating by Consolidated, careful estimates indicated that it would connect in its service areas 20,000 additional house-heating customers during the remainder of 1949, and 45,000 additional customers during the year 1950. The supply of gas in its distribution system would have accommodated this increasing demand through the construction of additional facilities. However, by May 22, 1950, Consolidated had approved for service approximately 164,000 new space-heating applications and had connected over 131,000 of these to its distribution system. It then appeared that demand had increased faster than supply was increasing through the construction of additional facilities, and that a critical situation had arisen which would jeopardize all existing users of gas unless some action were taken.

Accordingly, Consolidated filed its petition with this Commission requesting permission to discontinue the acceptance of space-heating customers, with the exceptions heretofore noted, and the hearing was held on May 22, 1950, and the Commission found as follows:

"The Commission after due consideration of said petition, upon information otherwise available to it and upon hearing duly had before it, finds that an emergency situation, which continues to exist, arose on or before May 22, 1950, with respect to the distribution and sale of natural gas by Michigan Consolidated Gas Company in its Detroit, Grand Rapids, Muskegon, Ann Arbor, Greenville-Belding, and Big Rapids districts." D–3430–50.3.

Consolidated discontinued all new space-heating applications as of April 7, 1951, but was accepting applications for gas for space-heating purposes in "new dwelling units where the input rating of all space-heating equipment installed or to be installed does not exceed the rate of 250 cubic feet of gas per hour" on February 16, 1951, when Prudential made application to it. This was in accordance with the discretion provided it in our Order D–3430–50.3. The issue is whether Consolidated's refusal to accept the application of Prudential for gas for space-heating purposes on the units being constructed by Prudential and covered in the application amounted to an unlawful or discriminatory administration of our Order D–3430–50.3.

Some time in the year 1950, Prudential purchased a piece of property in the city of Detroit which had been subdivided into 25 lots, 23 of said lots being 20 feet in width, and 2 of said lots being 25 feet in width. Prudential replatted the land into 20 lots of 25-foot width and proceeded to prepare plans for the construction of 10 buildings upon said lots. Each building provides under one roof separate and distinct living quarters for two families, divided by a party wall. In legal contemplation, each side of the building stands upon a separate lot

and the purchaser would take legal title to a lot 25 feet in width, the half of the building in which he lives, and certain reciprocal rights in the party wall.

These differ from the ordinary duplex or 2-flat in that the living quarters project horizontally rather than vertically. This method of land utilization avoids the necessity of having side yards which would have been otherwise required for each residence under the City of Detroit Zoning Ordinances. It also permitted Prudential to get many more living units into the same space than said space would ordinarily accommodate if single family residences on 40-foot lots were constructed. Accordingly, complainant's residence units would utilize more gas for space heating in the same area than such single-family home construction.

[1, 2] In our opinion, it is not the legal incidence of title, but the physical characteristics of the building which govern the application of our order. If it were not, there would be no end to the possibilities of this situation since prospective builders need not be limited to two units in a building, but might proceed to construct 4, 8, or 10 units in a row, as was proposed by Prudential's associated company, Lincoln Construction Company, only so long as legal title to units might be separately conveyed. However, the existing gas load upon Consolidated's distribution system in such an area would be increased all out of proportion to that contemplated by our order.

We believe in this situation we must look to the substance and not the form and in so doing we cannot find that the units constructed by complainant are of the type we intended to authorize by our Order D–3430–50.3. The term "new dwelling unit" in our order is plain and unambiguous and means a residence of a single family, is not two homes under one roof, or a double house; Schadt v. Brill (1913) 173 Mich 647, 139 NW 878. Accordingly, defendant did not act beyond the discretion given it by us in rejecting complainant's application for gas for space-heating purposes for the instant buildings.

Nor was complainant misled to its prejudice by any act of Consolidated, or this Commission. One of the partners of complainant is the secretary-treasurer of the Lincoln Construction Company, which appeared, informally, before this Commission on December 4, 1950. Lincoln Construction Company proposed to build 3 groups of buildings of 10 residence units in each group, and requested conference with this Commission to determine whether the proposed construction would be within the terms of the instant order. On December 7, 1950, the secretary of the Commission, at the direction of the Commission, wrote a letter to the Lincoln Construction Company, saying in part:

"The Commission, after due deliberation, has instructed me to advise you that their interpretation of the meaning of the proviso relating to 'new dwelling units' was intended to make ineligible for gas space heating row type multiple apartment dwellings such as the type you are now constructing, and for which you seek gas service."

Inasmuch as the instant application was not filed until February 16, 1951, complainant was on notice prior to

that date that the Commission order did not contemplate the eligibility of any row type construction of a multiple nature.

Other than these two instances, complainant and its associated company, Lincoln Construction Company, had constructed more than 1,500 homes in the Detroit area in the past year, and have all during such time enjoyed excellent relations with the defendant. Such a fact in and of itself would indicate that there is nothing arbitrary or capricious in the defendant's present action towards complainant.

Therefore, upon consideration of the files and records of this Commission pertaining to this matter, the petition and answer of the parties hereto, and upon the evidence and argument presented at hearing, the Commission finds as follows:

1. That our Order D–3430–50.3 does not delegate unlimited discretion to Consolidated, but is subject to our continual over-all supervision and examination, herein exercised, to avoid discriminatory administration.

2. That the units proposed to be constructed by prudential for which application for gas space heating was made to Consolidated do not come within the meaning of the term "new dwelling units" as used in our Order D–3430–50.3.

Therefore, it is *ordered* that the complaint of the Prudential Investment Company be and hereby is dismissed.

MICHIGAN PUBLIC SERVICE COMMISSION

Re Southeastern Michigan Gas Company

D–3770–51.4
June 15, 1951

APPLICATION *for approval of interruptible service rate for sale of natural gas; approval granted.*

Rates, § 384 — Natural gas — Interruptible service.

The Commission, in approving an interruptible service rate for the sale of natural gas, found that the inclusion of a specific standby requirement in the rate was not necessary, but provided that it should be distinctly understood and represented by the company that service under the rate was definitely interruptible or curtailable as found necessary and that no rights to firm gas would be acquired by virtue of service under the interruptible rate.

By the COMMISSION: On June 4, 1951, the Southeastern Michigan Gas Company filed with this Commission its petition requesting approval of an

interruptible service rate for the sale of natural gas throughout its service area outside of the city of Port Huron.

This Commission on May 31, 1951, approved an Interim Interruptible Off-Peak Service Rate for natural gas for the same company. That rate had a minimum bill of $342 per day and service under it would be available only until September 30, 1951, or the date on which "Trunkline" gas is available, whichever date is the earlier. That rate also required that the customer for interruptible gas should use at least 500,000 cubic feet per month under the company's filed General Service Rate.

It is now represented by the petitioner that there will still be additional quantities of gas available on an interruptible basis over and above that sold under the interim interruptible rate referred to above. It is further represented that the earnings from the sale of additional quantities of interruptible gas which will be available, at least until the load building program takes effect, will be beneficial to the company and to its firm customers.

The petitioner states that some of its prospective customers who have indicated an ability and willingness to take natural gas at the proposed interruptible service rate have standby facilities to use in case of interruption or curtailment, but that other prospective customers, who do not need continuous use of fuel for the requirements of their business, do not feel justified in investing in standby facilities, and that the type of business they operate will not greatly suffer from interruption of the gas supply.

The Commission after a careful consideration of the record in this matter is of the opinion that it need not require the inclusion of a specific standby requirement in this interruptible rate, but that it must be distinctly understood and represented by the company that service under this rate is definitely interruptible or curtailable as found necessary by the utility, and that no rights to firm gas service shall be acquired by virtue of service under this rate. Under these conditions, the Commission finds that the proposed interruptible service rate is in the public interest and should be approved.

VERMONT PUBLIC SERVICE COMMISSION

Re Citizens Utilities Company

No. 2400–2400A
July 30, 1951

PROCEEDING *on remand of cause relating to electric company's application for rate increase; increased rates allowed. For earlier decisions see (1948) 81 PUR NS 449; (1950) — Vt —, 82 PUR NS 125, 70 A2d 590.*

Valuation, § 224 — Rate base determination — Property under construction.

1. Property under construction may be included in the average net investment in utility plant for rate-making purposes where the company does not charge interest during construction or capitalize that interest and include it in the ultimate plant account relating to the property being constructed, p. 49.

Valuation, § 221 — Rate base determination — Water rights — Future use.

2. An electric company may not include flowage rights in its rate base where it has no definite plans for the use of such property in the near future and the property is not presently used or useful in serving the public, p. 50.

Valuation, § 250 — Rate base determination — Contributions in aid of construction.

3. Customer contributions toward the cost of electric line extensions to their property should be excluded from the company's rate base, p. 50.

Valuation, § 289 — Working capital — Elements included.

4. Working capital embraces an allowance for prepaid materials and supplies for conducting current operations and repairs and cash for use in operations in advance of collection, p. 50.

Valuation, § 293 — Working capital — Billing periods as factor.

5. The establishment of a cash working capital allowance on the basis of a bimonthly billing was considered proper for an electric company, p. 50.

Rates, § 321 — Electric company — Revenues and expenses — Normal year.

6. The Commission, in fixing rates for an electric utility obtaining a major part of its electrical energy by hydroelectric generation, based its decision on a normal water year instead of by using a "hydro clause" which would level off earnings on a monthly basis, p. 56.

Return, § 16 — Right to earn.

7. An electric utility is entitled to earn a fair return on its property used and useful in serving its customers, p. 56.

Return, § 25 — Attraction of capital — Returns in other enterprises.

8. The return an electric utility earns must be commensurate with returns on investments in other enterprises having corresponding risks and consistent with the interest of the financial integrity of the company, affording it the ability to maintain its credit and to attract new capital, p. 56.

Return, § 27 — Cost of capital — Dividend requirements.

9. An electric utility's actual earnings available for dividends and the dividends paid must be considered in determining cost of equity capital for rate-making purposes, p. 56.

Return, § 87 — Electric utility.

10. A return of 6½ per cent was held to be sufficient for an electric utility to pay all interest charges and dividends on preferred stock, to maintain its present dividend rate on common stock, and to leave a substantial balance for a surplus, but a 7 per cent return was allowed for a period during which the company charged increased rates as proposed under a bond pending Commission and court proceedings relating to the increase, because the company's reports for those years reflected the revenues which the Commission was to allow and if the company now had to make a downward revision of its past earnings, there might be an adverse effect on its credit position, p. 56.

Return, § 36 — Reasonableness — Quality of service.

11. The quality of utility service is an important consideration in determining a fair rate of return, p. 56.

APPEARANCES: Hubert S. Pierce and Milton S. Gould, for Citizens Utilities Company, Newport Electric Division; Clifton G. Parker, Attorney General, for state of Vermont; Leon D. Latham, Jr., for Grand Isle County Farm Bureau; Rudolph Daley, State's Attorney, Orleans county, for state of Vermont; Paul R. Rexford, for Orleans County Farm Bureau, Pomona Grange, Canadian Pacific Railway, and Merchants Association of the city of Newport; James Hoag, Chester Martel, Alan Kinney, Harrison Fowler, John Buerman, Van Vantine, P. A. Bartlett, E. B. Hill, D. Carl Foss, and Kirk Wilcox, pro se.

By the COMMISSION:

Amended Report

On the 27th day of April, A. D. 1951, this Commission filed its report, setting forth the findings of fact pertaining to the cause under consideration. The company, by its attorney, excepted to the findings contained in this report and, also, to the failure of the Commission to find as requested each and every proposed finding of fact and supplemental finding of fact submitted to the Commission by the company under the dates of January 19, 1951, and February 9, 1951. The Commission has carefully considered all exceptions, the proposed findings of fact, the proposed supplemental findings of fact, and the evidence in said cause and, wherever necessary, has made such changes in its final decision. In order to facilitate a clearer understanding of the whole matter before us, we are herein including the original report, as amended. The complete report follows:

On the 18th day of February, 1948, Citizens Utilities Company, a public utility corporation organized pursuant to the Laws of Delaware, engaged in the generation, transmission, and distribution of electricity, through its Newport Electric Division, in Grand Isle county, and in parts of four other Vermont counties; namely, Caledonia, Essex, Franklin, and Orleans, filed

with this Commission revised rate schedules for electric service in the area of its operations within the state of Vermont. These rates were in effect increases which were duly protested by more than five adversely affected customers at least six days prior to their effective date, March 19, 1948.

Citizens Utilities Company (hereinafter sometimes referred to as Citizens) placed these new rates in effect on March 19, 1948, by filing its bond in the amount of $100,000, as fixed by the Commission, payable to the Commission and its successors.

Public hearings were conducted at Newport, commencing June 2, 1948, and concluded on July 22, 1948. A hearing was also held at North Hero on July 21, 1948.

On November 30, 1948, 81 PUR NS 449, this Commission issued its findings that the rates filed by the company, effective March 19, 1948, were not just and reasonable and issued its order setting forth certain rate schedules to be effective for service within the state of Vermont, as of March 19, 1948, which were substantially lower than the tariffs filed by the company and designed to produce a return of at least 6 per cent on the company's rate base in a normal water year.

The order of the Commission was stayed pending judicial review by the Vermont supreme court, after exceptions by the company were allowed and the cause passed to said supreme court.

The supreme court reversed pro forma the order of the Commission and the cause was remanded for a hearing "de novo" in accordance with the views expressed in its decision. [(1950) — Vt —, 82 PUR NS 125, 70 A2d 590.]

The rate schedules which became effective March 19, 1948, under bond, have been continued in effect from time to time by increasing said bond to the present amount of $528,000.

Hearings in said remanded cause were commenced on April 3, 1950, and terminated on December 5, 1950. On April 17, 1950, during the course of the instant proceeding, Citizens filed with this Commission an additional revision of its tariffs pertaining to water heating to become effective April 23, 1950. The Commission suspended said rate and ordered an investigation of same and designated said cause as Docket PSC No. 2400–A. The Commission found that the issues in PSC No. 2400 and No. 2400–A were the same in law and in fact and consolidated both causes for hearing and final determination.

Citizens Utilities Company

The petitioner, Citizens Utilities Company, is a public utility operating in the states of Arizona, Colorado, Idaho, Maine, Vermont, and Washington. In Vermont, it operates as the Newport Electric Division, Citizens Utilities Company. It supplies manufactured gas, natural gas, telephone, water, electric service, and ice in one or more of these states. It also has two wholly owned subsidiaries; namely, Citizens Utilities Company of California, which supplies telephone and water service in the state of California, and Ketchikan Cold Storage Company of Alaska, which provides cold storage facilities. In 1949, consolidated operating revenues were $3,903,399, divided as follows:

electric operations, $1,699,110; gas, $898,911; water, $394,114; telephone, $602,960; and ice, cold storage, and other activities, $308,304. Computed on the rates allowed by the Commission by its order of November 30, 1948, *supra,* Vermont contributed $643,198 out of total electric operating revenues of $1,699,110.

Citizens maintains its general offices at Greenwich, Connecticut, and expenses incurred in the operation of these offices are apportioned to its various divisions and subsidiaries.

Rate Base

Electric Plant in Service

1948

Citizens had an investment in total electric plant serving its Vermont customers on January 1, 1948, in the amount of $2,426,077; its monthly average of changes in net investment during the year 1948 was $287,898. Deducting from the electric plant in service the reserve for depreciation at January 1, 1948, in the amount of $681,000, results in a net depreciated Vermont electric plant investment based on monthly average of $2,032,975, which includes construction work in progress, contributions in aid of construction, and property held for future use.

1949

The total electric plant of Citizens as of January 1, 1949, was $2,894,153; its monthly average of changes in net investment during the year 1949 was a decrease of $24,466. Deducting from the electric plant in service the reserve for depreciation at January 1, 1949, in the amount of $712,698, results in a net electric plant investment based on monthly averages in the amount of $2,156,989.

1950

The net electric plant of Citizens, including all types of property hereinbefore mentioned, based on monthly averages at January 1, 1950, was $2,147,516 after reflecting the monthly average of changes in net investment during the year of 1950 in the amount of $874 and deducting the reserve for depreciation on January 1, 1950, in the amount of $791,093.

1951

It is estimated by Citizens, and we concur, that its electric plant, including all types, in Vermont on January 1, 1951, would be $3,006,639. After reflecting the estimated monthly average of changes in net investment during the year 1951 in the amount of $26,006 and deducting its estimated reserve for depreciation at January 1, 1951, in the amount of $851,181, we find the monthly average net investment for 1951 of net electric plant, including construction work in progress and property held for future use, to be estimated at $2,181,464.

Construction Work in Progress

[1] In arriving at the average net investment in utility plant, we have included property under construction. The company does not charge interest while same is under construction nor is interest capitalized and included in its ultimate plant account relating to the particular property. In view of this, the company is entitled to earn on this type of property from its inception and before its completion and is properly included in the rate base. With the exception of the amount of $191,000 which the company spent as of

January 1, 1948, on a $500,000 diesel plant which was placed in operation in the early part of 1948, the amounts of this class of property have been insignificant and would reflect no material change in the net plant investment whether included or not:

January 1, 1948	$211,440.99
" " 1949	659.39
" " 1950	3,564.61

Property Held for Future Use

[2] Petitioner owns certain flowage rights which are included in the electric plant in its service account. The company has no definite plans for the use of such property in the near future and said property is not used or useful in serving the public. We cannot agree with the petitioner that this property should be included in its rate base and we have deducted the cost of these rights in the amount of $43,201.50 in our final calculations of said base. In the future, if these flowage rights are utilized in serving the public, they should then be considered as a part of the petitioner's net electric plant.

The company excepted to this finding as being against the weight of the evidence, contrary to the evidence, and contrary to the law. We have carefully considered this exception and are still of the opinion that this type of property should be excluded from the rate base.

Contributions in Aid of Construction

[3] Certain customers of the petitioner have in the past contributed toward the cost of line extensions to bring electric service to their property. We cannot agree that the petitioner should earn on same and that such contributions should be included as part of the net company investment. The total cost of such extensions appears in the plant account so we have deducted that portion contributed by the customers in arriving at the net ultimate company investment. The average amount in this account for the different periods is as follows:

1948	$22,051
1949–50–51	22,251

(Barnes, "The Economics of Public Utility Regulation," p. 423 (2).)

Working Capital

[**4, 5**] In addition to plant investment, petitioner is entitled to a return on working capital, including materials and supplies and cash allowance for operating expenses. In arriving at proper allowances for working capital, we must consider the conflicting amounts and estimates presented by the company and by the state. These are as follows: [See table, page 51.]

Joseph A. Staples, Jr., witness for the state, in his allowance for working capital has used for materials and supplies the average of the beginning and year-end balances plus cash computed on the basis of forty-five days' operating expenses excluding depreciation and taxes.

The company has used the highest balance of the year for materials and supplies and a somewhat higher amount than the state for cash allowance.

Working capital embraces an allowance for prepaid materials and supplies for conducting current operations and repairs and cash for use in operations in advance of collection. Public Service Commission v. St. Louis County Gas Co. (Mo 1943) 49 PUR NS 65.

In our judgment, the proper method

		Company		State	
1948	Materials & Supplies	$54,725		$37,020	
	Cash	72,680		45,425	
			$127,405		$82,455
1949	Materials & Supplies	$41,378		$37,142	
	Cash	62,126		38,829	
			$103,504		$75,971
1950	Materials & Supplies	$40,000		$37,142	
	Cash	73,750		38,829	
			$113,750		$75,971
1951	Materials & Supplies	$42,000			
	Cash	83,000		No Estimate	
			$125,000		

of establishing a reasonable cash allowance for the petitioner is to use the one employed by the company, which is the one based on a bimonthly billing. For Materials & Supplies, we find that the amount shown by state's witness Staples is ample for 1948, 1949, 1950. For the year 1951 (pro forma), we shall allow the company's figure as a reasonable estimate for Working Capital. Our allowance for Materials & Supplies includes Merchandise Inventory, although profits from merchandising are excluded from the cost of service.

We find that the company's net average investment or rate base is as follows for the years indicated:

	1948	1949	1950	1951
Net Electric Plant	$2,032,975	$2,156,989	$2,147,516	$2,181,464
Deduct:				
Property Held for Future Use	43,201	43,201	43,201	43,201
Contributions in Aid of Construction	22,051	22,251	22,251	22,251
Add:				
Materials & Supplies	37,020	37,142	37,142	42,000
Cash	72,680	62,126	73,750	83,000
Rate Base	$2,077,423	$2,190,805	$2,192,956	$2,241,012

Expenses

With the exception of allowance claimed by Citizens for taxes on income, there is little difference between the company's actual or estimated expenses and those advanced by the witnesses for the state for the years 1948 through 1950. We have also adopted the company's forecast of expenses for the year 1951 although they appear to be somewhat excessive based on the experience of the company.

The amount computed for Federal Income and State Franchise Taxes by Citizens and the state differ substantially. The tax rates used by both are 4 per cent for Vermont Franchise Tax and 38 per cent for Federal Income Tax in 1948, 1949, 42 per cent in 1950, and 47 per cent in 1951, but the treatment of deductions in arriving at the amounts resulted in tax allowances varying greatly from each other. We have studied these differences in computations and conclude that they are due to the use of income deductions, so-called, and increased amounts of expenses for tax purposes over and above the net expenses as shown on the books of the company by Citizens.

In computing taxes on income, Citizens as a taxpayer is allowed to deduct such items as interest, amortization of bond discount and expense, and miscellaneous income deductions before arriving at taxable income. In its 1948 Federal Income Tax Return, the company deducted $222,058.25 of such items in arriving at its computation of the amount due the Federal government. The company contends that in computing Vermont's portion of Federal Income Taxes, it is impossible to allocate any portion of the $222,058.25 to Vermont and, therefore, Vermont's share of Federal Income Tax should be computed with no income deductions. We cannot agree with the company that this is so, and shall make such computations that will reflect a fair and equitable share of the amount of the deductions in arriving at the amount of Federal Income Tax to be charged to the Vermont operation.

Further, in computing taxes on income, Citizens as a taxpayer is allowed as operating revenue deductions certain charges which are made to construction work, such as taxes and overhead. Deductions for depreciation for tax purposes are also of a greater amount than those actually accrued on the books of the company.

In computing its Vermont Franchise Tax for 1948, Citizens subtracted income deductions of $74,658.90 from its Vermont gross income before arriving at taxable income. It also used a depreciation expense of $80,501.10 for income tax purposes as against its book charge of $72,117.19. The amount used for taxes other than taxes on income was $68,337 although $407.57 was actually charged to construction. Operating and maintenance expenses deducted were $398,872.69, while these net expenses on its books were $349,540.44, due to transfers to construction and other accounts. Total credits taken by Citizens on its Vermont Franchise Tax for 1948 were as follows:

1. Interest on Long-term Debt	$71,661.03
2. Amortization of Debt Discount and Expense	1,000.28
3. Other Interest Charges	1,230.43
4. Miscellaneous Income Deductions	767.16
5. Depreciation Expense (excess over books)	8,383.91
6. Taxes Charged to Construction	407.57
7. Excess of Operating & Maintenance Expenses over Book Figures	49,332.25
Total Credits	$132,782.63

This represents a saving of $5,107.02 on the 1948 Franchise Tax Return on the amount which would have been paid if the above credits had not been taken ($\$132,782.63 + 1.04 \times .04$).[1]

In 1948, Citizens accrued $5,608.22 for Vermont Franchise Taxes and paid $997.62. Citizens contends that the amount accrued should be reflected as a proper charge in computing the cost of service to the customers and not the amount actually paid in order to safeguard the company against any additional assessment for taxes resulting from audit and examination of its returns. We cannot agree with this contention and find that in determining the cost of service, there should be included as a franchise or income tax expense, an amount no greater than the company actually paid as we are unable to find any evidence that Citizens underpaid its tax obligations in any year involved in this case.

[1] Vermont Franchise Tax paid is a proper deduction in computing both Federal Income and Vermont Franchise Taxes.

We have used the same deductions in computing the Vermont portion of the Federal Income Tax, which results in a tax liability to Federal government in the amount of $9,477.42 as compared with Citizens' tax accrual of $53,278.07.

Applying the same types of deductions and credits in computing both the Vermont Franchise Taxes and Federal Income Taxes for the year 1949, we find that similar differences exist. Additional illustrations for additional years have not been deemed necessary to demonstrate the methods employed by the company in computing its taxes.

Although Citizens has not reflected a certain portion of credits for Interest and Amortization of Debt Discount and Expense in computing its Federal Income Tax for Vermont due to the contention that they are on a company-wide basis, we find that an equitable portion should and must be allocated to Vermont. We have considered this apportionment and find that an allocation of Interest and Amortization of Debt Discount and Expense can be best provided by applying the ratio of Vermont's net plant to company's total net plant (utility plant less reserves for depreciation, depletion, and amortization) based on the average of beginning and year-end balances.

We have computed the following percentages based on petitioner's actual figures of net plant in its 1948 and 1949 annual reports to this Commission:

	Total	Vermont	Percentage of Vermont to Total
January 1, 1948	$4,650,557.31	$1,745,077.39	37.52%
December 31, 1948	6,224,635.19	2,181,455.49	35.04
Average for 1948			36.28%
January 1, 1949	$6,224,635.19	$2,181,455.49	35.04%
December 31, 1949	7,291,244.45	2,146,642.24	29.44
Average for 1949			32.24%

We do not have complete information available in order to arrive at the ratio of Vermont's net plant to company's total net plant for the years 1950 and 1951. In checking the respective ratios, commencing with January 1, 1948, we find that they are on a downward trend. If this same relationship should continue for the years 1950 and 1951, we believe that they would be less than 29.44 per cent as of December 31, 1949. However, we find that the percentage for the 1949 year-end figure of 29.44 per cent will be fair and reasonable for use in computing the allocation of Interest and Amortization of Debt Discount and Expense for 1950 and 1951.

For 1948, the above method of apportionment results in allocating $73,-075.62 as against $74,658.90 claimed on Citizen's Vermont Franchise Tax Return.

For 1949, this method allocates $80,629.64, as compared with $93,-747.21 claimed by Citizens.

Citizens' Corporate Operating Income before Federal Income Taxes for 1949 was $708,537.40. Vermont's operating income before Federal Income Taxes was $180,908.37, or a ratio of 25.53 per cent.

Citizens paid $141,484.26 for Corporate Federal Income Taxes for the year 1949. Vermont's share would be $36,120.93 on gross revenues of $643,198.42. We have allowed $40,708 on gross revenue of $653,348.

Citizens' payment of $141,484.26 includes Federal Income Taxes on $59,851.01 of nonoperating income.

Since we are concerned with the establishment of just and reasonable rates commencing with March 19, 1948, it is imperative upon this Commission to consider expenses and revenues as accurately commencing with that date as is possible. The state has used a period of March 1 to December 31, 1948, in its computations for 1948. The company has used figures for the entire year and multiplied them by 288/366 to allocate expenses for the period under study. In order to arrive at an amount which is fairest to the consumer and the company, we have used the actual monthly figures for the last nine months of 1948 plus 13/31 of the expenses incurred during the month of March as shown on State's Exhibit 103.

	Apr. 1, 1948 to Dec. 31, 1948	13/31 of March, 1948	Total
Purchased Power	$17,704	$7,094	$24,798
Diesel Operation	90,966	1,942	92,908
Diesel Maintenance	2,309	33	2,342
Administrative & General Expenses	35,046	1,853	36,899
Other Expenses	88,835	4,044	92,879
Total	$234,860	$14,966	$249,826
Depreciation	54,867	2,411	57,278
Taxes: Other than Taxes on Income	53,742	2,136	55,878
	$343,469	$19,513	$362,982

COST OF SERVICE

March 19–December 31, 1948

Operating & Maintenance	$249,826
Depreciation	57,278
Taxes Other than Taxes on Income	55,878
Return on Net Investment @ 7%	114,429
Federal Income Tax	30,788
Vermont Franchise Tax	3,241
Total Cost of Service	$511,440

COMPUTATION OF TAXES ON INCOME

March 18–December 31, 1948

Return

$$(7\% \text{ on } \$2{,}077{,}423) \times \frac{288}{366} = \ldots \$114{,}429.00$$

Deductions—Nontaxable Items:

1. Interest on Long-term Debt (36.28%—Vermont ratio of Net Plant to Total Plant)	$69,456.79
2. Amortization of Debt Discount & Expense (36.28%)	939.63
3. Other Interest Charges (36.28%)	2,679.20
4. Miscellaneous Income Deductions	124.50
5. Excess—Income Tax Depreciation over Book Amount	8,383.91
Total Deductions	$81,584.03

$$\$81{,}584.03 \times \frac{288}{366} = \$64{,}197$$

(March 18–December 31, 1948)

$114,429 — $64,197 = $50,232 Taxable Income after taxes

$50,232 ÷ $0.59615 [2] = $84,261 Taxable Income before Taxes

$84,261 — $3,241 = $81,020 Income Subject to Tax after Deducting Vermont Franchise Tax

State Franchise Tax (4%) $3,241 [3]

Federal Income Tax (38%) 30,788

COST OF SERVICE—1949

State's Exhibit 126	$293,518
Merchandise & Jobbing Profit Deducted	1,483
Operation & Maintenance	$295,001
Depreciation	86,020
Taxes: Other than Taxes on Income	73,978
Return (7% of $2,190,805)	153,356
Vermont Franchise Tax	4,285
Federal Income Tax	40,708
Total Cost of Service	$653,348

[2] After Federal Income Tax rate of 38 per cent and Vermont Franchise Tax of 4 per cent, each dollar of income before such taxes is reduced to 59.615 cents.

[3] Tax paid by company, $997.62 on revenues of $646,675.

Computation of Taxes—1949

Return (7% of $2,190,805)	$153,356.00
Deductions—Nontaxable Items:	
1. Interest on Long-term Debt (32.24%)	$75,889.44
2. Amortization of Debt Discount & Expense (32.24%)	1,913.28
3. Other Interest Charges (32.24%)	2,826.92
4. Miscellaneous Income Deductions	120.00
5. Excess—Income Tax Depreciation Over Book Amount	6,189.22
Total Deductions	$86,938.86

$153,356 — $86,939 = $66,417 Taxable Income after Taxes

$66,417 ÷ $0.59615 = $111,410 Taxable Income before Taxes

$111,410 — $4,285 (Vermont Franchise Tax) = $107,125 Income Subject to Tax after Deducting Vermont Franchise Tax

Vermont Franchise Tax (4%)	$4,285[4]
Federal Income Tax (38%)	40,708

Cost of Service, 1950

In computing the cost of service for 1950, the Commission had available the actual figures for the first eight months of 1950. For the remaining four months, we have taken 50 per cent of that amount, which we find is fair and reasonable based on the past experience of the company. Our computations follow:

Operating Expenses, Depreciation and Taxes Other than Taxes on Income (Eight months' actual is $313,018.16)	$469,527
Return @ 7% on $2,192,956	153,507
Vermont Franchise Tax	5,073
Federal Income Tax	53,268
Total Cost of Service	$681,375

Taxes on Income—1950

Return (7% on $2,192,956)		$153,507.00
Non-Taxable Items (Based on 1949):		
1. Interest on Long-term Debt (29.44%—Vermont Ratio of Net Plant to Total Plant)	$69,307.68	
2. Amortization of Debt Discount & Expense (29.44%)	1,747.12	
3. Other Interest Charges (29.44%)	2,581.40	
4. Miscellaneous Income Deductions	120.00	
5. Excess—Income Tax Depreciation Over Book Amount	6,189.22	
Total Deductions		79,945.42
Taxable Income after Taxes		$73,561.58

$73,562 ÷ $0.5577[5] = $131,902 Taxable Income before Taxes on Income

$131,902 — $5,073 = $126,829 Income Subject to Tax after Deducting Vermont Franchise Tax

Vermont Franchise Tax @ 4%	$5,073
Federal Income Tax @ 42%	53,268

Cost of Service—1951

*Operating Expenses	$330,870
*Depreciation	97,987
*Taxes—Other Than Taxes on Income	83,501
Return @ 6.5% on $2,241,012	145,666
Vermont Franchise Tax	5,704
Federal Income Tax	58,280
Total Cost of Service	$722,008

* Petitioner's Exhibit 164

[4] Tax paid by company, $3,296.88 on revenues of $643,198.

[5] After Federal Income Tax of 42 per cent and Vermont Franchise Tax of 4 per cent, each dollar of income before such taxes is reduced to 55.77 cents.

TAXES ON INCOME—1951

$145,666 — $79,945 [6] = $65,721 Taxable Income after Taxes
$65,721 ÷ $0.5067 [7] = $129,704 Taxable Income before Taxes on Income
$129,704 — $5,704 = $124,000 Income Subject to Tax after Deducting Vermont Franchise Tax

Vermont Franchise Tax @ 4.6%	$5,704
Federal Income Tax @ 47%	58,280

Normal Water Year

[6] In establishing rates for the future, we are faced with the problem of determining just and reasonable rates over a period when hydro generation may fluctuate considerably from year to year. This variation will have a major impact on Citizens' earnings. However, over a period of years, we are certain that the amount of kilowatt hours generated by hydro may best be determined by the establishment of a normal water year. We shall, therefore, design rates for the future based on the normal monthly hydroelectric generation for Citizens as follows:

January	1,224,000 Kw. Hr.
February	1,059,000 " "
March	1,780,000 " "
April	1,600,000 " "
May	1,968,040 " "
June	1,880,000 " "
July	1,101,000 " "
August	1,020,000 " "
September	1,044,000 " "
October	1,202,000 " "
November	1,764,000 " "
December	1,260,000 " "
Total	16,902,040 Kw. hr.

Citizens attempted to introduce evidence which would prescribe rates for each class of service adjusted by a hydro clause. The Commission excluded such evidence except as it pertained to the water-heating rate filed on April 23, 1950, as such evidence was not material to the rate filed to be effective March 19, 1948. The hydro clause would adjust the rates on the basis of 1/10 of a mill per kilowatt hour for each 15,000 kilowatt hour variation by which the preceding month falls below or rises above normal hydro generation for that month. This surcharge or credit would be further modified by an increase or decrease of 7.6923 per cent with each increase or decrease of one cent per gallon based on a 13 cent-per-gallon average cost of diesel fuel. Citizens, by the use of a hydro clause, seeks to level off earnings on a monthly basis while the adoption of rates based on a normal water year will adjust themselves in a fair and equitable manner over a period of years. We cannot agree that a hydro clause is necessary. We do find that a fuel clause in the industrial, wholesale and water-heating rates in the low rate block is justified and we shall prescribe one.

We do not propose to set rates for 1948, 1949, 1950 based on a normal water year because the results are already known. Since these years are on the low side of the normal water year, Citizens will benefit by having its full return for these years and a chance to earn more during the years when stream flows are above normal in the immediate future.

Rate of Return

[7–11] Citizens is entitled to earn a fair return on its property used and useful in serving its customers. The

[6] Same as amount used for 1950.

[7] After Federal Income Tax of 47 per cent and Vermont Franchise Tax of 4.6 per cent, each dollar of income before such taxes is reduced to 50.67 cents.

return must be commensurate with returns on investments in other enterprises having corresponding risks and consistent with the interest of the financial integrity of the company, affording it the ability to maintain its credit and to attract new capital.

Two factors which must be considered in determining the cost of equity capital are the actual earnings available for dividends and the dividends paid. To many, if not most investors, the amount which they actually receive for the use of their money may be a more important consideration than earnings which are left in the business and which, while they increase the value of the capital investment, are not available as income to the investor. (Barnes, *supra,* at p. 533.)

The testimony as to rate of return covers several hundred pages. For the company, Mr. Richard L. Rosenthal, its president, testified. For the state, Mr. Dale R. Goubleman, of the Federal Power Commission staff, and Dr. Martin L. Lindahl, of Dartmouth College, testified.

Any attempt to detail the testimony of these witnesses or to analyze their exhibits would require many pages of discussion and would, in the end, serve no useful purpose. Mr. Rosenthal testified that the company must have a return of 8 per cent for 1948, 1949, 1950 and a return of 7½ per cent for the future. Mr. Goubleman and Dr. Lindahl were of the opinion that a return of about 6¼ per cent was sufficient to maintain the company's credit and to attract new capital on favorable terms.

The company's capitalization as of May, 1950, after giving effect to its new bond issue of September, 1950, was:

Funded Debt	$7,758,470
Preferred Stock	51,170
Common Stock Equity	3,684,079
Total	$11,493,719

The average cost of Funded Debt was 3.49 per cent, or $270,771 annually, and on preferred stock, 5 per cent, or $2,559.

A return of 6½ per cent on its capital would provide $747,092, and after provisions for interest and preferred stock dividends, would leave $473,762 available for equity. Similarly, a return of 7 per cent would provide a gross return of $804,560 and $531,230 for equity.

In 1949, Citizens paid out $182,995.05 in cash dividends on its common stock consisting of 264,974 shares at the end of the year. In addition, it paid a stock dividend of $64,357.75. We consider a stock dividend as simply another way of dividing the pie without increasing its size. If a stockholder owning 100 shares or 10 per cent of the stock of a corporation receives a stock dividend of 3 shares, his holdings increase to 103 shares but it is still only 10 per cent of the stock. There may be a slight advantage for tax purposes to a stock dividend but we find this to be a minor consideration.

A common dividend payment of $183,000 out of net earnings of $473,762 or $531,230 is a pay-out of only 38 per cent and 34 per cent, respectively. This is a very low pay-out and we find that this policy has the effect of requiring customers to pay higher rates in order that additions and replacements of property can be

made out of earnings instead of issuing new securities.

A return of 6½ per cent and 7 per cent on total capital gives petitioner a return on equity of *12.86 per cent* and 14.42 per cent, respectively. We have taken judicial notice of the present earnings, dividends, and yields of Citizens' common stock. The June 7, 1951, issue of "Public Utilities Fortnightly," p. 797, a reliable source of information as indicated by the record, shows that on May 11, 1951, Citizens' common stock with earnings of $1.93 per share for the year 1950 was selling on the market at about $15 per share, or at a return of *12.87 per cent* with a dividend pay-out of only 41 per cent.

The cost of capital cannot be determined by any exact formula and is a matter of judgment. Considering all the evidence in the case, we find that for the past three years and for the next few years, petitioner can reasonably finance plant expansion and maintain its credit with a return of 6½ per cent on the rate base allowed in this case. This, of course, is predicated upon Citizens being able to earn the same return on its other operations.

We find that a 6½ per cent return will be sufficient to pay all interest charges, dividends on preferred stock, maintain its present dividend rate on common stock, and leave a substantial balance for surplus. We do allow 7 per cent for that period because the company's reports for those years already reflect the revenues which we are to allow and if the company now had to make a downward revision of its past earnings, there might be an adverse effect on its credit position.

There is no evidence that the company will need large sums of equity capital in the near future. At all times material in this case, the company has provided all permanent capital from earnings and debt securities. An increase in cash dividends on its present stock will make new issues more desirable. At its 1949 dividend rate, petitioner will have available, on our proposed return, some $300,000 of annual earnings for plant expansion before any new capital is required. In 1949, Citizens experienced an operating loss of $7,723.83 on the Bangor property which it had purchased in 1948.

In determining a fair rate of return, the quality of service is an important consideration. The evidence in 1948 showed that the service in Grand Isle county was subject to frequent and lengthy outages. We have been urged by counsel for some Grand Isle customers to establish rates for that area below the level of those for the balance of the system. The evidence in 1950 shows that Citizens has made some progress in improving service in Grand Isle. Due to the improvement in service, we find that a lower rate in Grand Isle should not be ordered. We also find that a reduction in the over-all rate of return to offset poor service is not required and should not be ordered.

In arriving at the fair rate of return, we have endeavored to afford proper consideration and to attach proper weight to general economic conditions, the ability of the rates established to attract capital and maintain the financial integrity of the petitioner, the current cost of capital, the petitioner's financial history, the risk of the enterprise compared to that of other economic enterprises, the general efficien-

cy of the petitioner's management, the quality of service rendered, and the effect of the rate on the capacity of the public to avail itself of the service offered. It is at this point that we conclude the interest of the consumer and the investor are equitably balanced. Re New England Teleph. & Teleg. Co. (1949) 115 Vt 494, 512, 513, 79 PUR NS 508, 66 A2d 135.

Required Rates

We find that the rates filed by Citizens Utilities Company for effect March 19, 1948, and April 23, 1950, are not just and reasonable and we shall proceed to determine rates which will be just and reasonable.

To earn 7 per cent on the rate base found above would require gross revenues as follows:

1948	$511,440
1949	653,348
1950	681,375
	$1,846,163

The results for 1948 and 1949 are actual, while 1950 represents eight months' actual increase by 50 per cent. In 1949, the last four months' revenues were 51.44 per cent of those for the first eight months.

For the period starting January 1, 1951, we shall prescribe rates designed to produce gross annual revenues of $722,008 based on 1950 kilowatt-hour sales. On the experience of Citizens itself in 1950 and on the general upward trend of electric sales throughout the country, we are certain that the rates based on 1950 sales will produce somewhat higher revenues than our estimate.

Our cost of service for 1951 assumes normal hydro generation of 16,902,040 kilowatt hours.

However, our cost of service for the period ended December 31, 1950, considers only the actual hydro generation except that the last four months of 1950 are estimated. Compared with normal hydro generation of 16,902,040 kilowatt hours, Citizens actually generated by hydro only 11,023,395 kilowatt hours in 1948 and 13,608,400 kilowatt hours in 1949. In 1949, normal hydro generation would have saved Citizens $28,457 on diesel fuel. After deducting Federal and state taxes on income, the net increase in operating income would be $16,965 or a return of .78 per cent on the rate base as found.

Re Mohawk Sales, Incorporated

No. 22203
August 2, 1951; rehearing denied August 23, 1951

PETITION *of sales company requesting Commission to investigate and determine status of Tele-Magnet answering device and to suspend telephone company's rules prohibiting its use; denied.*

Service, § 435 — Telephones — Attachment of answering device.

A sales organization's request that the Commission suspend the rules and regulations of a telephone company prohibiting the use of privately owned answering devices on its lines was denied where it appeared that the device, known as a Tele-Magnet, would manipulate the telephone instrument, that its mal-functioning would affect the company's service, and that a grant of the request would, in effect, divide the responsibility for service between the utility and parties not under Commission jurisdiction.

Service, § 435 — Telephones — Answering devices.

Statement that the telephone industry has been negligent in not developing and offering to the public a satisfactory answering device, p. 61.

APPEARANCES: J. D. Beeler, President, Mohawk Sales, Inc., Evansville, and Darby & Fitzgerald, Attorneys at Law, Evansville, for petitioner; T. D. Stevenson, Indiana Bell Telephone Co., Indianapolis, for respondent; Walter F. Jones, Jr., Public Counselor, for the public.

By the COMMISSION: On June 5, 1950, Mohawk Sales, Inc., a corporation organized under the laws of the state of Indiana, with its principal office at 125 N. W. Third street in the city of Evansville, Indiana, filed a verified petition requesting the Public Service Commission of Indiana to investigate and determine the status of the instrument known as the Tele-Magnet and requested the Commission to suspend that portion of the General Rules and Regulations filed by the Indiana Bell Telephone Company in its Tariff filing marked, P. S. C. I. No. T–6, Part 1, § 1, Second Revised Sheet 3.

The Commission set this matter for public hearing for 10 o'clock A.M., in the rooms of the Commission, 401 State House, Indianapolis, Indiana, on October 10, 1950, which hearing was postponed until October 25, 1950, at 10 o'clock A.M. At said hearing, the Commission introduced Exhibits Nos. 1, 2, and 3 which were proofs of publication in the Indianapolis Times, the Evansville Courier, and the Evansville Press.

At the hearing, the Commission heard its chief engineer, Mr. W. F.

Lebo, who introduced his report which was marked, Public Exhibit No. 1. This report explained the tests which he had made on one of the instruments known as the Tele-Magnet. Mr. Lebo recommended that further tests of this instrument be made in actual operation on the premises of the subscribers.

The petitioner, Mohawk Sales, Inc., placed on the witness stand, Mr. J. D. Beeler, who testified that he was president of the Mohawk Sales, Inc. and that his company had a franchise area for the sale of the instrument known as the Tele-Magnet. He also testified on contracts that they had made for the sale of their instrument which he had not been able to deliver because of the Indiana Bell Telephone Company's refusal to allow the instrument to remain on the lines.

The petitioner placed on the witness stand Mr. Norman Krauss who testified that he had purchased one of the instruments and used it to receive orders before his business establishment opened in the morning and after it had closed in the evening. Mr. Krauss operates a laundry and dry cleaning establishment in Evansville.

After hearing all of the evidence in this cause at the hearing on October 25, 1950, the Commission was of the opinion that it should have a further test of the Tele-Magnet answering device and authorize the Mohawk Sales, Inc. to install twelve devices in Evansville for test purposes and that a further hearing would be held in this matter.

On March 27, 1951, the Commission advised the interested parties in this cause that there would be a continued public hearing on April 13, 1951, at 10 o'clock A. M., in the rooms of the Commission.

At the above hearing Mr. Lebo, chief engineer for the Public Service Commission, reported on the results of the test he had observed at Evansville and the Commission took evidence from other parties who desired to testify.

The petitioner placed on the witness stand Mr. Ralph West who is chief engineer of the Mohawk Sales, Inc. in New York and who explained the construction and operation of the instrument.

The respondent, Indiana Bell Telephone Company, placed three witnesses on the stand who testified as to matters concerning the development of answering and recording devices.

The various parties placed some twenty-five exhibits in the record and testified to the extent of about 370 pages of testimony.

The petitioner and respondent both filed briefs in this matter and the Commission feels that it is fully advised and is in a position to rule and issue an order.

The Commission is further of the opinion that the Tele-Magnet device does manipulate the telephone instrument and that mal-functioning of the device will affect the operation of the telephone service. It therefore follows that if the Commission should allow this device or a similar device to be attached which is contrary to the rules and regulations of the telephone company, the responsibility for service would be shared by others who are not under the Commission's jurisdiction.

The Commission is further of the opinion that the telephone industry and particularly the Bell system has been

negligent in not developing a satisfactory device and offering to the public this added service.

The Commission is therefore of the opinion that it would not be in the public interest to suspend the Indiana Bell Telephone Company rules and regulations against the attachment of the Tele-Magnet device as long as the responsibility of the operation and maintenance is outside the control of the telephone company, and it is also of the opinion that the petition to suspend the rules and regulations prohibiting the use of the Tele-Magnet should be denied and it will be so ordered.

It is therefore *ordered* by the Public Service Commission of Indiana that the petition of the Mohawk Sales, Inc., to suspend the rules and regulations prohibiting the use of the Tele-Magnet device is denied.

It is *further ordered* that petitioner shall pay into the Treasury of the State of Indiana through the Secretary of this Commission, the sum of $19.14, said sum being the cost of publication of legal notices in this cause.

COLORADO PUBLIC UTILITIES COMMISSION

Re Dorothy Cowan et al. Doing Business As "Cowan Coal & Feed Yard"

Application No. 11164, Decision No. 37010
July 2, 1951; rehearing denied August 8, 1951

APPLICATION *for authority to transfer motor carrier certificate of convenience and necessity; denied.*

Certificates of convenience and necessity, § 25 — Jurisdiction of Commission — Transfer of motor carrier certificate — Transferor's liability for debts.

1. The question of liability of persons seeking Commission approval of a transfer of a motor certificate for the debts of a person who had previously operated under their certificate is a legal one over which the Commission does not exercise jurisdiction, p. 63.

Certificates of convenience and necessity, § 143 — Transfer — Requirement that obligations be satisfied.

2. Certificates of convenience and necessity against which certain obligations are outstanding will not be transferred until satisfactory arrangements have been made for taking care of such obligations, p. 63.

Certificates of convenience and necessity, § 143 — Transfer — Satisfaction of obligations.

3. The Commission will refuse to authorize the transfer of a motor carrier's certificate while a dispute exists as to who is liable for certain outstanding obligations incurred by a previous operator under the certificate and will hold up its approval until the obligations are taken care of or until a determination is made by a court of competent jurisdiction that the present certificate holders are not liable for the indebtedness, p. 63.

APPEARANCES: Marion F. Jones, Denver, for applicants; A. J. Fregeau, Denver, for Weicker Transfer and Storage Company; R. E. Turano, Denver, for Rio Grande Motor Way, Inc.; Frank Weigner, Denver, for Engine Supply Company.

By the COMMISSION: By Decision No. 36225, dated March 10, 1951, the Commission found that Dorothy Cowan and Muriel Patricia Brooks, doing business as "Cowan Coal & Feed Yard," Salida, Colorado, are the owners of PUC-1250. On April 19, 1951, the above-named owners filed an application with this Commission to transfer the above-numbered certificates to V. E. Williams, of Salida, Colorado.

The application was regularly set for hearing, and heard, at the Court House in Pueblo, Colorado, on May 29, 1951, and at the conclusion of the hearing, the matter was taken under advisement.

At the hearing, the evidence disclosed that V. E. Williams, the transferee herein, is the owner of Permit No. C-5757, and by virtue of the ownership of said C-permit, owns considerable equipment; and he has operated under said permit for the past sixteen years, and is well qualified through experience, as well as financially, to conduct a satisfactory operation under said certificates.

[1-3] The present owners of the certificates contracted with one F. D. McGlothlen, and the Commission, by Decision No. 30911, dated July 28, 1948, authorized McGlothlen to go into possession of said certificates and to continue operations thereunder until December 6, 1950, when he surrendered possession of said certificates to the transferors herein; that during the McGlothlen operation, he incurred numerous debts and obligations which have never been paid, viz.:

Argys Bros. Garage, 215 E. 1st, Salida, Colo.	$701.74	(secured Note)
Argys Bros. Garage, 215 E. 1st, Salida, Colo.	1241.45	
Rainbow Cottage Camp, Rainbow Blvd., Salida, Colo.	197.50	
Stapleton Chevrolet, 148 E. 1st, Salida, Colo.	997.72	(secured Note)
Bob's Tire Shop, 204 E. 1st, Salida, Colo.	38.21	
Biglow's Service Co., 3rd & E, Salida, Colo.	127.16	
Salida Transfer, 128 G, Salida, Colo.	177.66	
Sassar Service Station, Salida, Colo.	80.00	
Kaess Motor Co., 330 W. Grand Ave., Salida, ...	436.32	
Skelly Motor Inn, 413 W. Rainbow Blvd., Salida,	52.57	
Engine Supply Co., 1862 Lawrence St., Denver, ..	285.15	
Shirley Avery, Buena Vista, Colo.	475.00	
S & C Enterprise, 328 E. Fillmore, Colo. Spgs. ..	183.60	
State Highway Comp. Tax, State Office Bld., Denver, ...	121.69	(Lien)
State Highway Comp. Tax, State Office Bld., Denver, ...	54.52	(Lien)
Transportation Tax, US Govt. Customs Hse. Denver.	199.19	(Lien)
G & R Service, Gunnison, Colo.	65.74	
South Park Merch., Hartsel, Colo.	7.74	
Colo. Mtr. Carriers' Assn. 407 Denham Bld., Denver. Colo.	30.31	
Roth Motor Co., 353 W. Main, Littleton, Colo. ..	5.00	
Ross & Sons Service, 4600 Lafayette, Denver, Colo.	32.59	
United Tire Co., 245 Broadway, Denver, Colo.	53.44	
Iowa Home Mutual, Kittredge Bld., Denver, Colo.	833.28	
H & D Chevrolet, Canon City, Colo.	5.42	
Texas Creek Service, Texas Creek, Colo.	1.45	

W. E. Schrader, 1110 F, Salida, Colo. (approx)	95.00	
Richard Glover, Salida, Colo. .... (approx)	260.00	(wages)
Frank Jefferson, 224 Poncha Blvd., Salida (approx)	55.00	
Warren Hall, Salida, Colo. (approx)	300.00	(wages)
Gene Wall, Salida, Colo. (approx)	250.00	(wages)
Vernon Borden, Salida, Colo. .... (approx)	375.00	(wages)
Bill Dowdy, Howard, Colo. .... (approx)	75.00	(wages)
Total	$7,814.45	

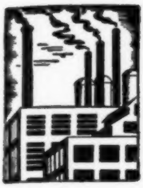
In our Decision No. 36225, the Commission held that the certificate was never transferred to McGlothlen and at all times remained the property of the transferors herein. The present transferors disclaim liability on the numerous debts and obligations incurred while McGlothlen was in charge of the operations under said certificates, contending that they are not legally bound to pay said debts. The question of liability of transferors herein is, in our judgment, a legal question and one over which the Commission does not exercise jurisdiction. The Commission, several years ago, established the policy that certificates of public convenience and necessity, having incurred obligations which were not paid, should not be transferred until satisfactory arrangements had been made for taking care of said obligations.

In the instant case, the Commission does not know whether the transferors are legally liable for the operations conducted by McGlothlen. If they are, some arrangements should be made to take care of these obligations; while, on the other hand, if they are not legally liable, the transfer should be authorized. Under the showing here made, the Commission, following the policy above referred to, feels that it is in the public interest to deny the instant application. In other words, before a transfer is made, the question of the outstanding obligations should be taken care of, either by payment or arrangements therefor, or by a determination of a court of competent jurisdiction, that said certificate holders are not liable for said indebtedness.

The Commission finds that the instant application should be denied for the reasons heretofore set forth in our statement, which, by reference, is made a part of these findings.

Order

The Commission *orders* that the instant application be, and the same is hereby, denied.



Industrial Progress

A digest of information on new construction by privately managed utilities; similar information relating to government owned utilities; news concerning products, supplies and services offered by manufacturers; also notices of changes in personnel.

Gas Companies Plan Huge 5-year Expansion Program

Gas utility companies and pipeline companies in the United States expect to spend approximately $4.59 billion for construction of new facilities and expansion of present plant and facilities in the five-year period from 1951 through 1955, according to a survey by the bureau of statistics of the American Gas Association. During the past five years, 1946-1950, the nation's distribution and pipeline companies spent $3.99 billion for the purchase and construction of new plant and equipment.

The forecast for 1951 indicates estimated expenditures of $1.54 billion and it is estimated that the industry will spend an additional $1.30 billion in 1952 to take care of prospective new customers and increased consumption of present customers. Estimates declined to $707.5 million for 1953, $553.8 million for 1954 and $492.8 million to be spent for construction in 1955.

As during the past five years when $2.19 billion were spent, natural gas transmission lines continue to represent the largest single category of expenditures with $2.40 billion or nearly one-half the total expenditures being devoted to natural gas construction. Because the rapid growth of natural gas distribution is bringing a major transition in the gas industry, the forecasts for the manufactured, mixed, and liquefied petroleum gas branches were combined. Total expenditures of $397.2 million were forecast for these branches during the next five years. Anticipated expenditures for the development of underground storage facilities for the first time were shown in the current survey. The gas industry expects to spend $92 million for such facilities in the coming five-year period.

Natural Gas Storage Plans Underground Storage Area

Natural Gas Storage Company of Illinois proposes the development of a multimillion dollar underground storage area for natural gas in Kankakee and Iroquois counties, Illinois.

The project, with an ultimate estimated cost of $36,200,000, would be used to store natural gas for Natural Gas Pipeline Company of America and Texas Illinois Natural Gas Pipeline Company.

The company plans to commence the project by July, 1952, and to complete it for initial operation within a year. The project would be progressively enlarged as materials become available and the demand for gas in the areas served by Natural and Texas Illinois may require. Initial cost of project is estimated at $18,100,000.

New Pipe Coupling Described in Bulletin

A new-style compression pipe coupling which, it is claimed, practically eliminates turbulence at the joint, is being manufactured by the Morris Coupling & Clamp Company.

The coupling is made up of three parts: 1) a gasket made of the material best suited to give protection for the specific job application; 2) steel inner sleeve with precision die-cut teeth placed eccentric to the gasket teeth to form a complete seal when the outer shell is tightened; and 3) steel outer shell made of zinc-coated steel or corrosion resistant metals when required, with zinc-coated washers, bolts and nuts.

A bulletin describing the coupling in detail may be obtained by writing the Morris Coupling & Clamp Company, P. O. Box 632, Ellwood City, Pennsylvania.

Texas Eastern to Expand System By 791 Mi. of 30-inch Line

Texas Eastern Transmission Corporation, is engaged in an expansion program which will expand its present system by 791 miles of 30-inch line, making an extensive network of 4,230 miles of natural gas pipeline. The 30-inch pipeline is the largest expansion engaged in by Texas Eastern since the formation of the corporation in 1947 to purchase the wartime Big Inch and Little Big Inch pipelines.

From a point near Kosciusko, Mississippi, the new 30-inch line extends in a northeasterly direction through the flats of Mississippi, the famous Muscle Shoals watershed in Alabama, bisects the state of Tennessee, crosses the hills and bluegrass section of Kentucky, through southern Ohio, crosses the panhandle

(*Continued on page* 34)

Mention the Fortnightly—*It identifies your inquiry*

of West Virginia and terminates near Connellsville, Pennsylvania, where it ties into the existing facilities of the company. Its 400 million cubic feet daily capacity will increase Texas Eastern's daily delivery capacity to greater than 1.2 billion cubic feet.

The total cost of the new construction is estimated at $114,300,000 which, in addition to the pipeline, includes eight new compressor stations, the development of a gas storage field in western Pennsylvania, a 35-mile, 30-inch line to the storage field and the conversion of four oil pumping stations to gas compressor stations on existing lines east of Connellsville.

The southern end of the line, near Kosciusko, will tie in with United Gas Pipe Line Company's new line being built to bring gas from fields in the Gulf Coastal area. United Gas has contracted to deliver up to 134 billion cubic feet of gas per year to Texas Eastern's Kosciusko terminal. At the northern end of the line near Connellsville, the gas will either be placed in Texas Eastern's existing system or will be placed in the company's Oakford Storage field to be held for winter demand. Much of this gas will ultimately be sold to Algonquin Gas Transmission Company who will supply eastern New England consumers. Some of the gas will be used to increase the supply available for Texas Eastern's present customers.

The route of the pipeline crosses seven rivers—the Tennessee, Cumberland, Kentucky, Hocking, Muskingum, Monongahela, and Ohio. The Ohio River is crossed twice—at the northern border of Kentucky and the southeastern border of Ohio. In most cases, two lines will be laid as a safeguard against floods.

The new compressor stations on the 30-inch line will provide 53,800 additional horsepower to Texas Eastern's system. The conversion and reactivation of four oil pumping stations and two new stations will provide 50,680 h.p., giving the system a total installed horsepower of 381,880.

Alabama Power to Spend $100,000,000 on Construction

ALABAMA POWER COMPANY expects to spend approximately $100,000,000 for expansion over the next three years. The company now has nearly a million kilowatts of generating capacity, according to Thomas W. Martin, president.

New Anti-rust Paint

RUST-CURE, a new labor-saving, anti-rust paint which can be applied right over rust without wire-brushing, scraping, or sand-blasting, is announced by The Monroe Company, Inc., Cleveland.

Available in black, aluminum and clear, Rust-cure is suitable for both interior and exterior use on either old or new metal. Upon

(*Continued on Page* 36)

application, it is said to penetrate through any existent rust layer and effectively seal the surface against further rust action. It is compounded for brush application and may be thinned with Rust-cure Solvent for spray use. Rust-cure in black and aluminum is for use solely as a finish coat, while Rust-cure clear can be painted over in any desired color. Rust-cure aluminum is reputed to contain almost twice as much aluminum pigment as ordinary paints and to give an exceptionally brilliant finish coat.

Rust-cure is available in one-gallon and five-gallon cans and in 55-gallon drums. For further data, write The Monroe Company, Inc., 10703 Quebec avenue, Cleveland 6, Ohio.

$60,500,000 Expansion Program Planned by Toledo Edison

TOLEDO EDISON COMPANY plans to spend approximately $60,500,000 for new construction in the five years 1951 through 1955.

Of this total, $13,400,000 will be spent this year, $6,400,000 next year, $12,000,000 in 1953, $14,000,000 the following year, and $14,700,000 in 1955. The company spent about $7,375,000 in the first half of the year.

Principal items include a 60,000-kilowatt unit to be completed this year to replace a 20,000-kilowatt unit at the Acme station, and a new generating plant at an undisclosed site, the first 100,000-kilowatt unit of which is expected to be in operation by the end of 1955. The Acme replacement will require expenditure of about $5,672,000 this year, while the new station, with substations and transmission lines, will cost around $13,500,000.

Completion of the five-year program will raise the net system capability to 475,000 kilowatts.

G-E Appointment

DONALD F. WARNER has been appointed assistant to the manager of engineering for the General Electric Company's turbine department, according to an announcement by E. E. Parker, manager of engineering for the department.

In his new position, he will coördinate and assist in the design and development of steam turbines, gas turbines, and superchargers, as well as being consultant to the aircraft gas turbine department. In this capacity he will be located in the Lynn River (Mass.) Works of the General Electric Company.

Philadelphia Electric to Spend $365,000,000 in 5-year Program

THE PHILADELPHIA ELECTRIC COMPANY'S overall construction program includes plans for the addition of 1,508,000 kilowatts of electric generating capacity during the period 1945 to 1956, of which 708,000 kilowatts have already been installed. The remaining 800,000 kilowatts are now under construction, or planned.

(*Continued on Page* 38)


"SUPER INCH"
P. G. and E.'s 34-inch natural gas transmission line — world's largest — cost $63,000,000 . . . Topock to Milpitas—502 miles . . . In service November 1950.
From Texas and New Mexico to the Bay Area through more than 1,000 miles of pipeline and three big compressor stations . . . .
Super Inch delivery will total 400,000,000 cubic feet* each day by late 1951, serving more than a million users in Northern and Central California.
*400,000,000 cubic feet, laid end to end would reach more than three times around the world at the equator.
219-51S
P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

The system's electric generating capacity at the end of 1956 is expected to be 2,686,000 kilowatts, considerably more than double the capacity at the end of the war. Similarly, investment in gas and steam facilities in this period will be approximately doubled.

The overall program has already cost $217,000,000, and will require expenditures of about $365,000,000 more in the years 1951 to 1956.

Panhandle Eastern Completes $80,000,000 Expansion

COMPLETING an $80,000,000 expansion program, the Panhandle Eastern Pipe Line Company recently augmented its natural gas producing facilities by 350,000,000 cubic feet daily to a new level of 850,000,000 cubic feet a day.

Serving such highly-industrialized territories as Illinois, Indiana, Ohio and Michigan, Panhandle Eastern now supplies gas for nearly 7,000,000 persons in the middle-western district of the United States and the Province of Ontario. The increased output was made possible by tying in with the Trunkline Gas Company, a recently-acquired subsidiary, at Tuscola, Ill. The Trunkline Company operates out of the natural gas fields in Louisiana and Texas. Panhandle's main source of supply starts in the Panhandle and Hugoton gas fields of Texas, Oklahoma, and Kansas.

The Trunkline Gas Company controls reserves of two trillion cubic feet which, when added to the reserves owned by Panhandle Eastern, amount to more than nine trillion cubic feet. This is twenty-five years' supply based on the daily capacity of the combined systems.

Western Massachusetts Cos. Plan New Construction

WESTERN MASSACHUSETTS COMPANIES plans to spend approximately $12,000,000 on new construction this year and next, with most of that total to go for a second 46,000-kilowatt generating unit at its West Springfield, Massachusetts, steam plant.

The new unit is scheduled to go into operation in December, 1952. Additional substations, transmission and distribution lines also will be built under the expansion program.

Westinghouse to Undertake $296,000,000 Expansion

THE WESTINGHOUSE ELECTRIC CORPORATION will undertake a $296,000,000 expansion program extending beyond 1953, President Gwilym A. Price announced following a meeting of the board of directors recently.

The expansion program will be the second such program undertaken since the end of World War II. The first, announced in 1945, was completed in 1948 at a cost of approximately $150,000,000 and increased manufac-

(*Continued on Page* 40)

turing facilities by 50 per cent.

The electrical industry, although one of the oldest in the United States, has shown its greatest growth in the past ten years, Mr. Price observed. In the years 1948 to 1950, he added, Westinghouse sales and net income exceeded even wartime peaks and were more than 500 per cent of the rate for 1938-39, while sales during the first six months of 1951 were at a higher rate than during the corresponding period of 1950.

Monongahela Power Puts New 80,000-kw. Plant in Operation

MONONGAHELA POWER COMPANY, a subsidiary of West Penn Electric Company, has placed in operation a new 80,000-kilowatt generating unit at its Rivesville station southwest of Morgantown, West Virginia.

The company reported completion of the first of two 75,000-kilowatt units at its nearby Albright station, scheduled for June, 1952, may be delayed by the uncertainty of steel deliveries. The second unit was scheduled to go in operation six months later.

West Penn, which is spending $36,000,000 for expansion this year, expects all available capacity to be fully employed in meeting the peak loads of next winter. As for the winter of 1952-1953, the company said "a temporary capacity shortage may develop because of inadequate allocations of critical materials for generating facilities."

Brooklyn Union Gas to Extend Pipeline

THE Brooklyn Union Gas Company of Brooklyn, New York, has been authorized by the Federal Power Commission to build 3,700 feet of pipeline in Brooklyn to supply natural gas to the Williamsburg power plant of the New York City Board of Transportation.

The line will cost $110,000 and will extend from the company's twenty-inch line at Penn street and Bedford avenue to the Williamsburg plant. The gas will be used to generate electricity.

Public Service Co. of Col. Plans $64,000,000 Program

PUBLIC SERVICE COMPANY OF COLORADO estimates its construction program for the years 1951 through 1953 will cost $64,000,000, of which $45,000,000 will be spent on additions and improvements to its electric facilities.

About $25,000,000 of the three-year expenditures will be allotted for additional power plant capacity. This will provide for completion of the 120,000-kilowatt Arapahoe plant in Denver, a 7,500-kilowatt addition at Grand Junction, and a 60,000-kilowatt unit at the Lacombe plant in Denver. The remaining $20,000,000 to be spent on electric operations will go mainly for transmission and distribution facilities.

Expansion of the utility's gas department will cost $15,000,000, while general and miscellaneous construction will involve $4,000,000.

Mountain Fuel Supply Plans $6,950,000 Program

MOUNTAIN FUEL SUPPLY CO., natural gas supplier in Colorado, Wyoming, and Utah, recently revealed plans to spend $6,950,000 for new construction and acquisition of properties in 1951 and 1952.

Expenditures will be allocated among the company's major operating divisions as follows: production, 48%; transmission, 3%; distribution, 43%; and miscellaneous, 6%. In the four year period from 1947 through 1950 the company spent $20,695,562 for expansion.

New Tweco Literature

TWECO PRODUCTS COMPANY has issued a 12-page catalog which illustrates and describes its complete line of electrode holders, ground clamps, cable connectors, terminal connectors, cable splicers, mechanical and solder type cable lugs, carbon electrode holders and the new "Lug-Set" block and punch for attaching solder type lugs to cables without solder.

Copies of the bulletin may be obtained, without charge, from the manufacturers, P. O. Box 666, Wichita, Kansas.

New England Cities Soon to Get Natural Gas

NORTHEASTERN GAS TRANSMISSION COMPANY, subsidiary of Tennessee Gas Transmission Company is building a $28,000,000 New England pipeline distribution system and has natural gas in its main and lateral lines in a major portion of the territory to be served in Massachusetts. About 75% of the customers which it plans to serve can have natural gas as soon as conversions can be completed.

Natural gas first became available in the Northeast recently when it moved into the mains of Springfield Gas Light Company. Worcester Gas Light Company expects to be converted to 100% natural gas before the end of this month. Holyoke Gas Light Company started conversion operations recently and expects to be on 100% natural gas by October 21st. The conversion crew then will move into the Pittsfield Gas Light Company territory.

Nordberg Appointment

APPOINTMENT of Bruno V. Nordberg as sales engineer, four-cycle engine department is announced by R. W. Bayerlein, vice president, heavy machinery division, Nordberg Manufacturing Company, Milwaukee 7, Wisconsin.

A native of Wisconsin, Mr. Nordberg is a grandson of the founder of Nordberg Manufacturing Company, Bruno V. Nordberg and son of Bruno V. E. Nordberg who was executive engineer of the company at the time of his death in 1946.

Mr. Nordberg joined the Nordberg Manufacturing Company in 1946 and was assigned as a test and erection engineer in the heavy machinery division. He was later transferred to engineering installation, a position retained until his recent appointment.

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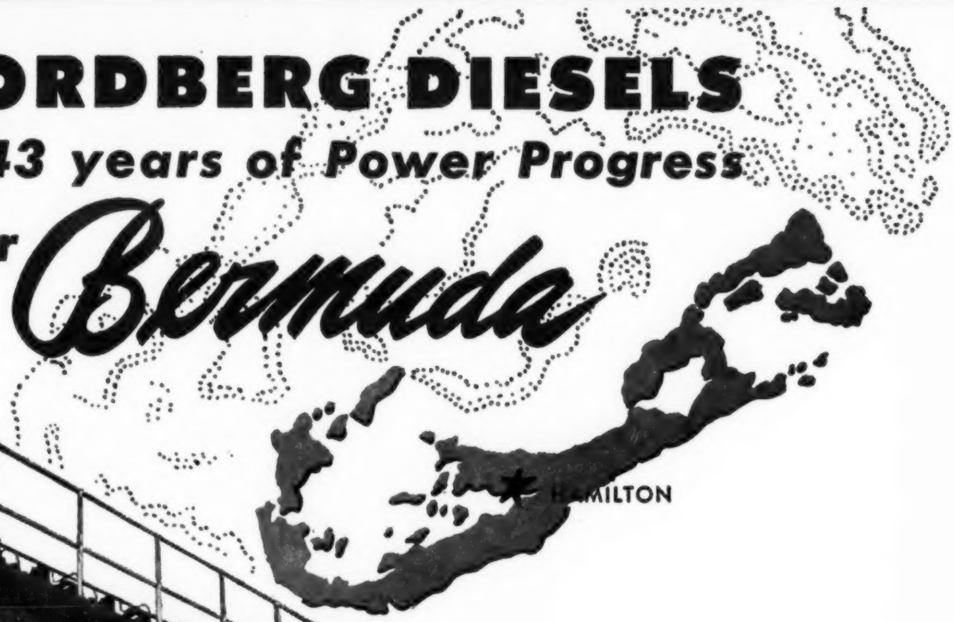
TWO NORDBERG DIESELS

round out 43 years of Power Progress for *Bermuda*

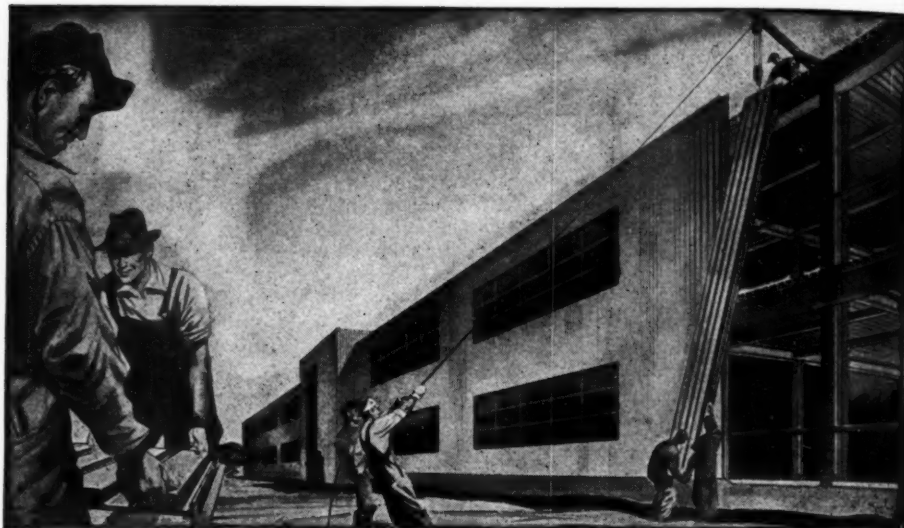


☆ *The Bermuda light plant* is located in the heavy residential section of Pembroke Parish, a scant mile from the heart of Hamilton. Consequently there can be no objectionable noise . . . a problem overcome by reducing the intake and exhaust noise levels to a minimum through modern silencing techniques. Exhaust from the big new Nordberg is heard as a deep throated "whisper".

latest 4250 hp Nordberg Unit

Exhaust from the big new Nordberg is heard as a deep throated "whisper".

what we really make is time!



it's faster to hang a wall than to pile it up...

Little blocks, say 2" x 4" x 8", don't pile up very fast.

We hang walls up in sizable panels.

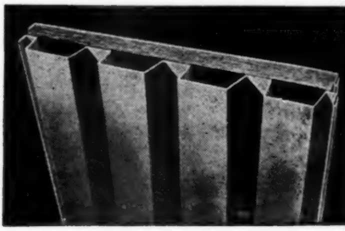
And that is an easy way to understand why Robertson's real product is *time*.

We make walls that are hung in place. We make them complete with insulation when the panels are delivered. We engineer them piece by piece in advance at the factory. We put expert crews on the job to place them.

We make time, now, when time is the essence.

We save days and weeks in finishing a building for *use*, because years have been put into the development of these unique skills.

Quick is the word we practice.



Q-Panels are fabricated from Galbestos, aluminum, stainless steel, galvanized and black steel in lengths up to 25'.

Q-Panels, 3" in depth with 1½" of incombustible insulation, have a thermal insulation value superior to that of a 12" dry masonry wall with firred plaster interior. A single Q-Panel with an area of 50 sq. ft. can be erected in nine minutes with a crew of only five men, and twenty-five workmen have erected as much as an acre of wall in three days.

Q-Panel construction is quick, dry, clean, and offers an interesting medium of architectural expression.

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A Message Of Thanks from The Columbia Gas System *to* All Its Suppliers

We, of the Columbia Gas System, are sincerely grateful to our suppliers for all their efforts in our behalf during the past difficult year.

The unavoidable steel shortages created by our country's re-armament policy . . . the unpredictable and often disastrous vagaries of weather . . . have made for an extra and heavy burden on all.

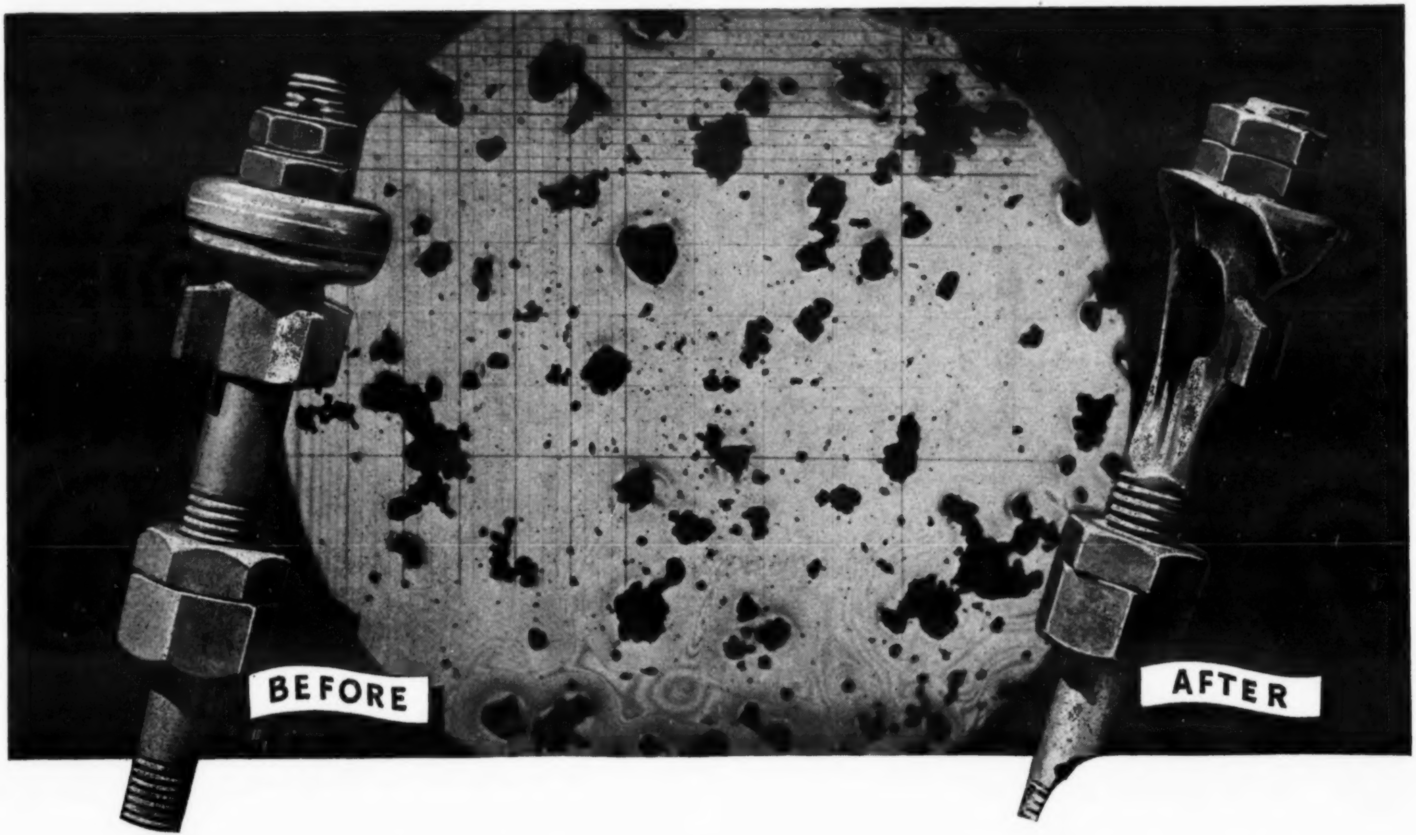
Our mutual task remains . . . to bring the benefits of Natural Gas to more people and to more industries.

Thanks for your help.

Stuart M. Crocker
STUART M. CROCKER
Chairman

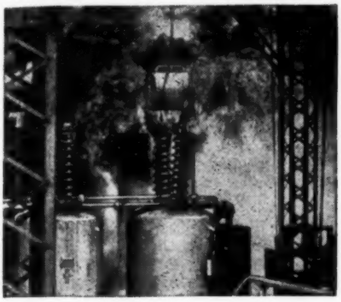
George S. Young
GEORGE S. YOUNG
President

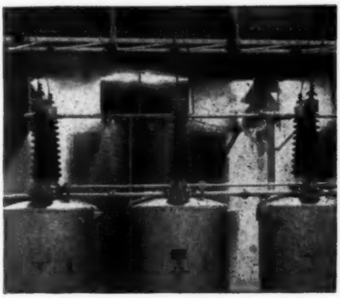
COLUMBIA GAS SYSTEM



The Toll of "MICRONIC BOMBING"

Probably not, since it measures only .000039 in.—
the width of one of the fine lines shown above





PROTECTING

flammable, oil-filled

TRANSFORMERS

with time-tested, rapid extinguishing

GRINNELL MULSIFYRE

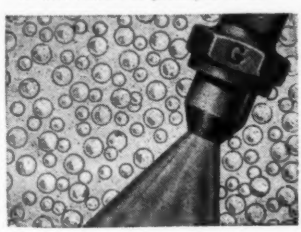
In case after case, where Grinnell MULSIFYRE has been on guard, hazardous oil fires have been effectively controlled—damage limited. For example . . .

• On August 2, 1944, a fault occurred on the 26 KV ring bus at a substation of the Public Service Electric & Gas Co., Harrison, New Jersey. Following the tripout, the operator noticed the end bay, where the transformer was located, to be ablaze. He immediately activated the electrical control operating the Grinnell MULSIFYRE System, deluging the transformer banks with water spray and extinguishing the fire.

• At a substation of the Omaha Public Power District, Omaha, Nebraska, two 25-year-old three phase 6250 KVA 13.2—2.3 KV water-cooled indoor type transformers were protected by a MULSIFYRE System automatically actuated by Quartzoid Pilot Sprinklers. On August 30, 1944 a minor explosion occurred, setting the transformer afire. The Grinnell MULSIFYRE System went into operation immediately, and there was no fire damage.

• In 1948, a lightly constructed wooden sawing shed was erected by the Singer Manufacturing Company, Bridgeport, Connecticut, adjacent to a bank of three 500 KVA transformers. A fire started in the shed, apparently when a carelessly discarded cigarette or match ignited sawdust, and quickly burned through the roof. The MULSIFYRE System operated over the exposed transformers, preventing damage to them.

Stop future trouble and expense. Get complete facts now on reliable Grinnell emulsion-forming spray systems. Write Grinnell Company, Inc., Providence, R. I. Branch offices in principal cities.



GRINNELL *Mulsifyre*

EMULSION-EXTINGUISHMENT OF OIL FIRES

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a long way in a short time . .

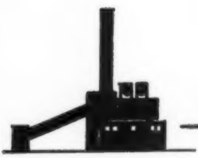
FIVE-FOLD EXPANSION IN TEN YEARS

The large up-to-the-minute steam-electric station, depicted here, again furnishes proof of management's desire to keep up with the needs of a growing economy.

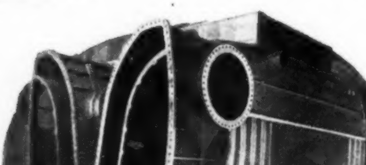
The area served by this central station consists of free-enterprising people who depend on an uninterrupted and adequate source of electric power for their growing industries. The Midwest Utility which serves this community built its first 60,000 kw unit in the area in 1942 to meet the industrial needs of World War II. Today a five-fold expansion program, which will bring the station's installed capacity up to 300,000 kw, is drawing to a close.

Foster Wheeler Steam Generators, Condensers, and Auxiliary Steam Generating Equipment

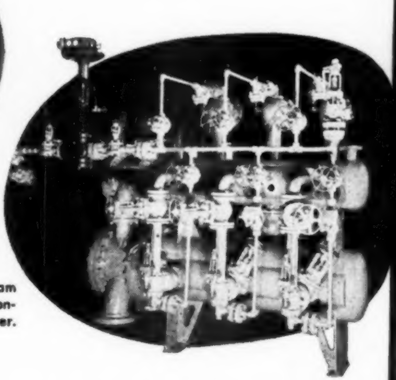
The Foster Wheeler installations which contribute so largely to the success of this great undertaking include four 640,000 lb per hr steam generators with Ball Mill Pulverizers, firing equipment, and plant equipment including condensers, steam jet air ejectors and feedwater heaters.



FROM 60,000 to 300,000 KW



Shop photograph of one of the 55,000 sq ft Foster Wheeler surface Condensers serving the 60,000 kw turbines.



Shop view of a Foster Wheeler steam jet air ejector which removes non-condensible gases from the condenser.

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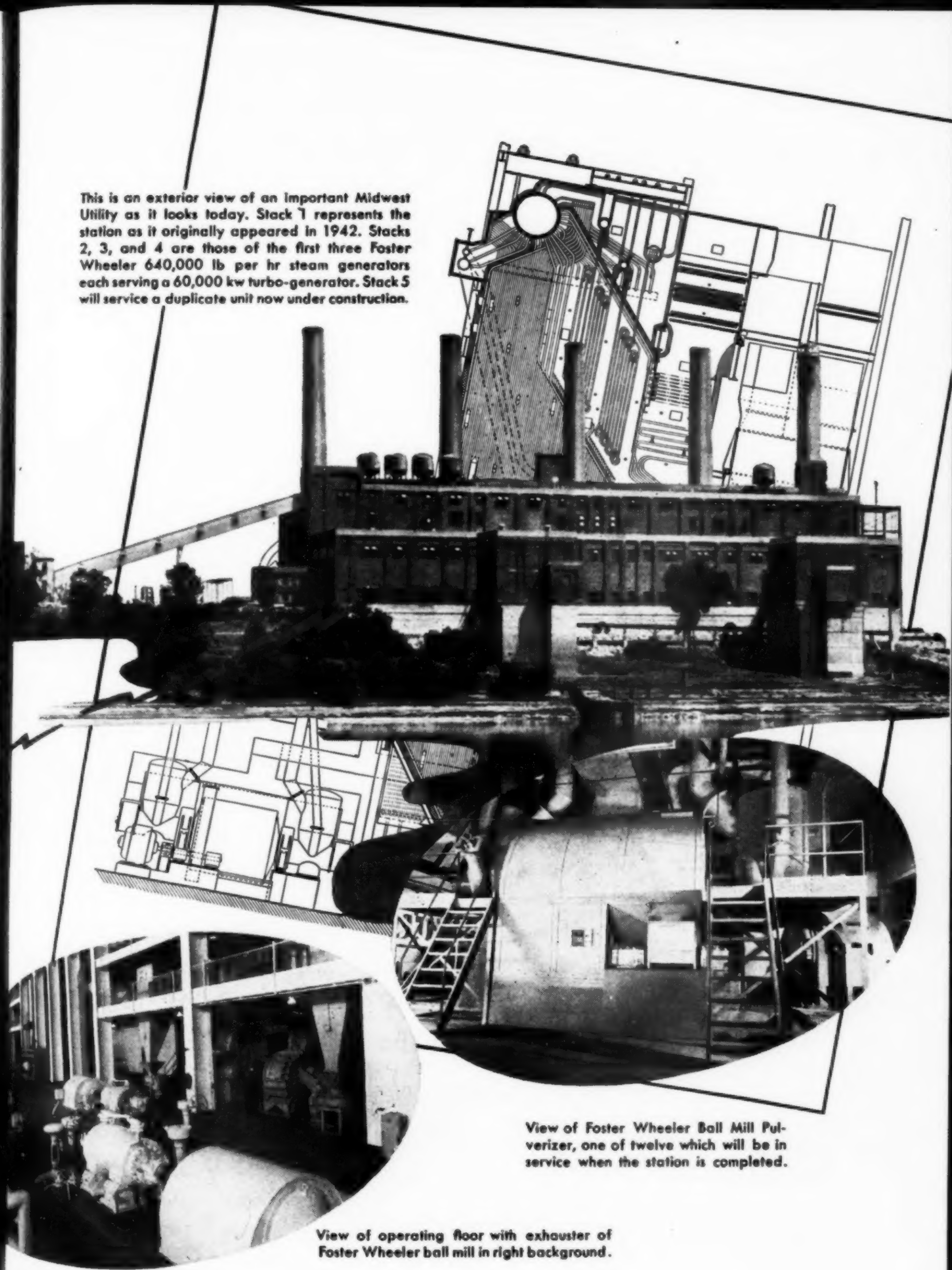

This is an exterior view of an important Midwest Utility as it looks today. Stack 1 represents the station as it originally appeared in 1942. Stacks 2, 3, and 4 are those of the first three Foster Wheeler 640,000 lb per hr steam generators each serving a 60,000 kw turbo-generator. Stack 5 will service a duplicate unit now under construction.

View of Foster Wheeler Ball Mill Pulverizer, one of twelve which will be in service when the station is completed.

View of operating floor with exhauster of Foster Wheeler ball mill in right background.

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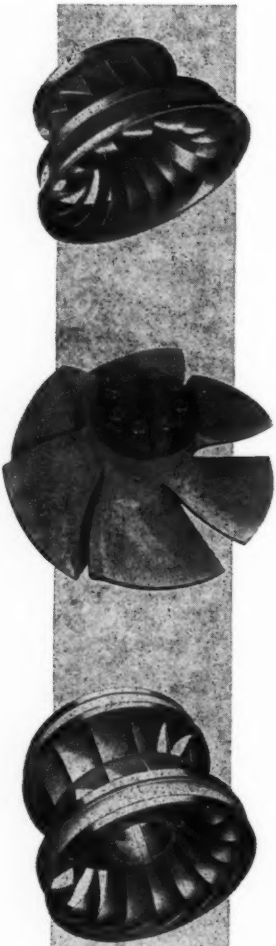

You measure turbine performance in terms of power and long-range economy. That means your hydraulic power installation should have a turbine which will give you efficient power with years of trouble-free service. Leffel has been building turbines which do just that for over 89 years—since 1862. A Leffel turbine holds the world's record of 94.57% efficiency! And this outstanding efficiency is always coupled with dependability and long life, as many Leffel turbines have proven by over half a century of actual service.

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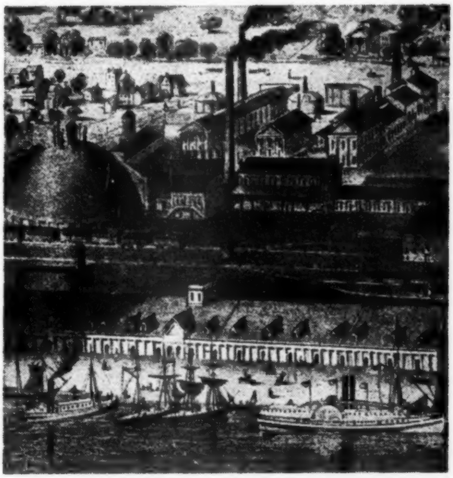
One hundred years ago the Detroit Gas Light Company made its first few hundred feet of gas, sending it through small mains to a few scattered homes in which the newly developed gas lamps of that day were installed. Three days later the first gas lamps were lighted in the streets of Detroit.

From that beginning our Company has grown into the great distribution system which today serves more than 715,000 customers living in 69 cities, villages and communities of Michigan.

We enter our second century with long range plans to keep pace with the growth of the communities served. We aim to maintain the highest standards of service, with a deep sense of our responsibility and our obligation to contribute in every way we can to the public good.



From an 1855 lithograph, showing the first Detroit gas plant at 6th and Woodbridge Streets.

MICHIGAN CONSOLIDATED GAS COMPANY

One of two 60-cell, FME-17 Exide-Manchex Batteries providing emergency power in the Edgemoor Station.

Delaware Power & Light Co., new Edgemoor Generation Station, Wilmington, Delaware. Built by United Engineers & Constructors Inc.

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Exide-Manchex BATTERIES

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LOW MAINTENANCE COSTS: Water required about twice a year. No change of chemical solution needed during life of battery.

LOW DEPRECIATION: Sturdy, long-life construction.

GREATER CAPACITY in a given amount of space avoids overcrowding of equipment.

These features all contribute to the dependable performance of Exide-Manchex Batteries—help make Exide-Manchex *your best battery buy* for all control and substation services.

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Much has been learned during those 16 years. Though the time is too short to specifically predict length of battery life, definite conclusions have been reached regarding proper application. We will be glad to inform you where these cells can satisfactorily serve.

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1888 . . . DEPENDABLE BATTERIES FOR 63 YEARS . . . 1951

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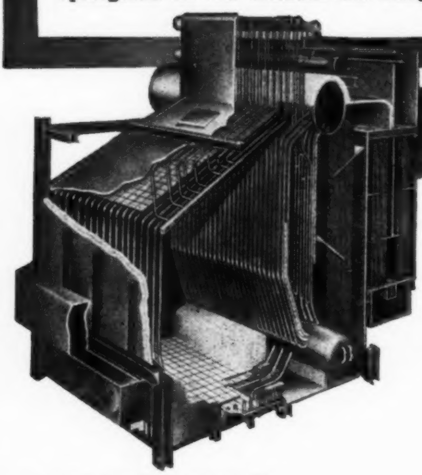

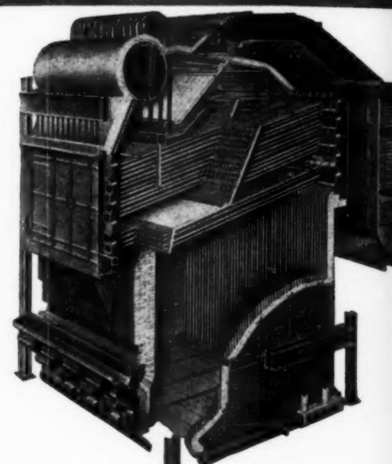

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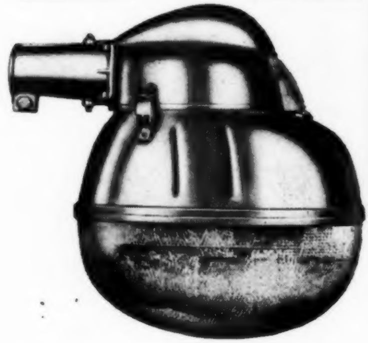

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